File Westwater
copy to Sue

IN REPLY REFER TO

United States Department of the Interior

3600
(U-068)

JIM

MAR 1 8 1982

BUREAU OF LAND MANAGEMENT
Moab District
Grand Resource Area
P.O. Box M
Moab, Utah 84532

Mr. Gilbert Hart
Utah Div. Oil, Gas & Mining
4241 State Office Bldg.
Salt Lake City, Utah 84114

Dear Mr. Hart:

After careful analysis and evaluation of all public comments received, and a thorough interdisciplinary review of the proposal's impacts, I have made a decision regarding the application for mining of humate material near Westwater, Utah (Harley Dome area). My decision to proceed with the sale of the material was made after determining that proper mitigation of the identified impacts would reduce them to an acceptable level, within the Bureau's commitment to multiple use.

The answers to questions or concerns in the comment letters are contained in the final Environmental Analysis on pages 29-32 and the Comment Evaluation on pages 33 - 80. I believe the use of comments is visible and traceable through this method. Your comment is not included in the comment analysis and evaluation because it was received after the close of the public comment period.

Our next step will be to formally call for a competitive oral bid for sale of the material. This sale will be announced in the local media.

If you have any questions or comments, please feel free to contact me at (801) 259-6111 extension 201. Thank you for your interest in the management of your public lands.

Sincerely yours,

Colin P. Christensen
Area Manager

Enclosure:
Final EA

RECEIVED
MAR 1 6 1982
DIVISION OF
OIL, GAS & MINING

"DECISION RECORD/FONSI"
For Sale of Humates in
Harley Dome Area

EA No. UT-060-GR-82-23

FONSI: The proposed action and alternatives to surface mine humate material from a 250 acre area near Harley Dome, Utah has been analyzed and determiend that no significant impacts are expected to occur as a result of proceeding with the proposed action. Therefore, an EIS is not required.

DECISION: The decision is to proceed with a competitive sale for 1.12 million metric tons of humate material on 250 acres as requested by Baker Associates, Inc. of Richfield, Utah. The sale will be by oral bidding at the Moab District Office. If Baker Associates, Inc. is the successful bidder the decision is to allow them to proceed with their proposed action. This decision is based upon Baker Associates, Inc. commitment to the mitigating measures as set forth in the EA and any additional standard stipulation currently in use by the District in this area.

RATIONALE: The EA analyzed the impacts of a proposal by Baker Associates, Inc. if another company is the successful bidder an additional EA will have to be prepared based on their proposed action.

It was determined in the EA that proper mitigation of the identified impacts would reduce them to an acceptable level. This determination along with BLM's commitment to multiple use management led to the decision to proceed with the sale.

Area Manager, Grand Resource Area

3/8/82
Date

EA No. UT-060-GR-82-23

Big Flat-Squaw Park MFP Amendment/Final Environmental Assessment for Surface Mining of Carbonaceous Shale (Humate).

Prepared by the Moab District of the Bureau of Land Management, Colin P. Christensen, Grand Resource Area Manager, Sand Flats Road, Moab, Utah 84532

February 20, 1982

I. INTRODUCTION

A. Purpose and Need

This EA/Amendment is being written to amend the Management Framework Plan (MFP) for the Big Flat-Squaw Park Planning Unit which was completed in 1977.

The proposal addressed below is a non-BLM proposal that was not addressed in the original MFP. The proposal doesn't contradict the original MFP but since it would be a new type of activity in the area it was decided to prepare an amend ment under 43 CFR 1601.6-3(b).

A competitive sale for carbonaceous shale (humates) is proposed for an area in Grand County, three miles south of Harley Dome, Utah, because of a request from Baker Associates, Inc. of Richfield, Utah to purchase a minimum of 1,120,000 metric tons of humate material from this location.

The purpose is to provide humates to the agricultural market on a competitive basis. The humate mined from the area would be used as a soil conditioner.

The use of humate as a soil conditioner is relatively new, and the market for it is still developing. Baker Associates Inc., have a contract to sell humate material for $5/ton to Westwater, Inc. of Hawthorne, Nevada. Two areas in New Mexico are currently mining humates for use as a soil condition.

In 1975, one company purchased rights to mine humates for $.50/ton and the other company purchased rights for $.60/ton. The proposed site has less overburden than the New Mexico deposits, and the humate is of similar quality. Although the proposed mine site is not as well located with respect to potential buyers as the New Mexico sites, the in-ground value is expected to be similar.

Burdick (1965) studies showed that humates added to soils in quantities of 200-250 pounds per acre, produced positive results in increasing crop production. It pointed out that the humate addition to the soil produced the following results.

a. Supply plant nutrients by liberating CO_2 by means of the salts of humic acid.

b. Increase water holding capacity because of the clayish content.

c. Increase tillability by preventing clodation and stratification in the soil.

d. Reduce erosion by increasing cohesive force through the addition of the fine kaloinite and montmorillonite clay.

e. Increase in plant nutrients through the addition of the many nonorganic chemicals found in the humates.

f. Increase heat holding capacity of the soil because of the dark color of the humate.

The chemical analysis performed by Environmental Biochemists of Alburquerque, New Mexico and American Chemical & Research Laboratories of Spanish Fork, Utah, show that the humates from the project area have a high level of organic matter (45-50 percent) with humic acid concentrations of 25 per cent. The actual chemists analysis is found in Appendix A.

B. Background and History

Humates deposits are found throughout east-central Utah, western Colorado and New Mexico.

Swanson (1977) has defined and described humates in detail (see Appendix B). The method of disposing of humates from public lands has been put forth in Bureau of Land Management (BLM) Instruction Memorandum No. 78-97 (see Appendix C). This memorandum states that humates are to be disposed of as a type of stone under the Material Act of 1977.

Samples of humates were collected for analysis by BLM and sent to Ford Chemical Laboratory in Salt Lake City. British Thermal Unit (BTU) values ranged from 25 to 8,850 BTU's/lb. and had an average of 2,321.5 BTU's (see Appendix D). This average value is well below the BTU values of leasable coal. Since humates are formed as a result of oxidation of lignite or subbituminous coal one would expect to find samples containing higher BTU values where weathering is not complete or where the material is far from the outcrop. The subject deposit may have small isolated occurrances of coal associated with the weathered coal (humate); however, it is not of such a quality and quantity that it could ever be mined economically for its value as a fuel.

II. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Baker Associates, Inc. of Richfield, Utah, has requested a competitive sale for 1.12 million metric tons of humates material from the BLM. If they are the successful bidder, they proposed to surface mine the humates from a 250 acre area located within Section 22, T. 19 S., R. 25 E., SLB&M. The proposed project site is located approximately 65 miles east along I-70 from Green River, Utah and 3 miles south on a county road from Harley Dome, Utah (Figure 1). The area is 5 miles west of the Utah-Colorado State Line.

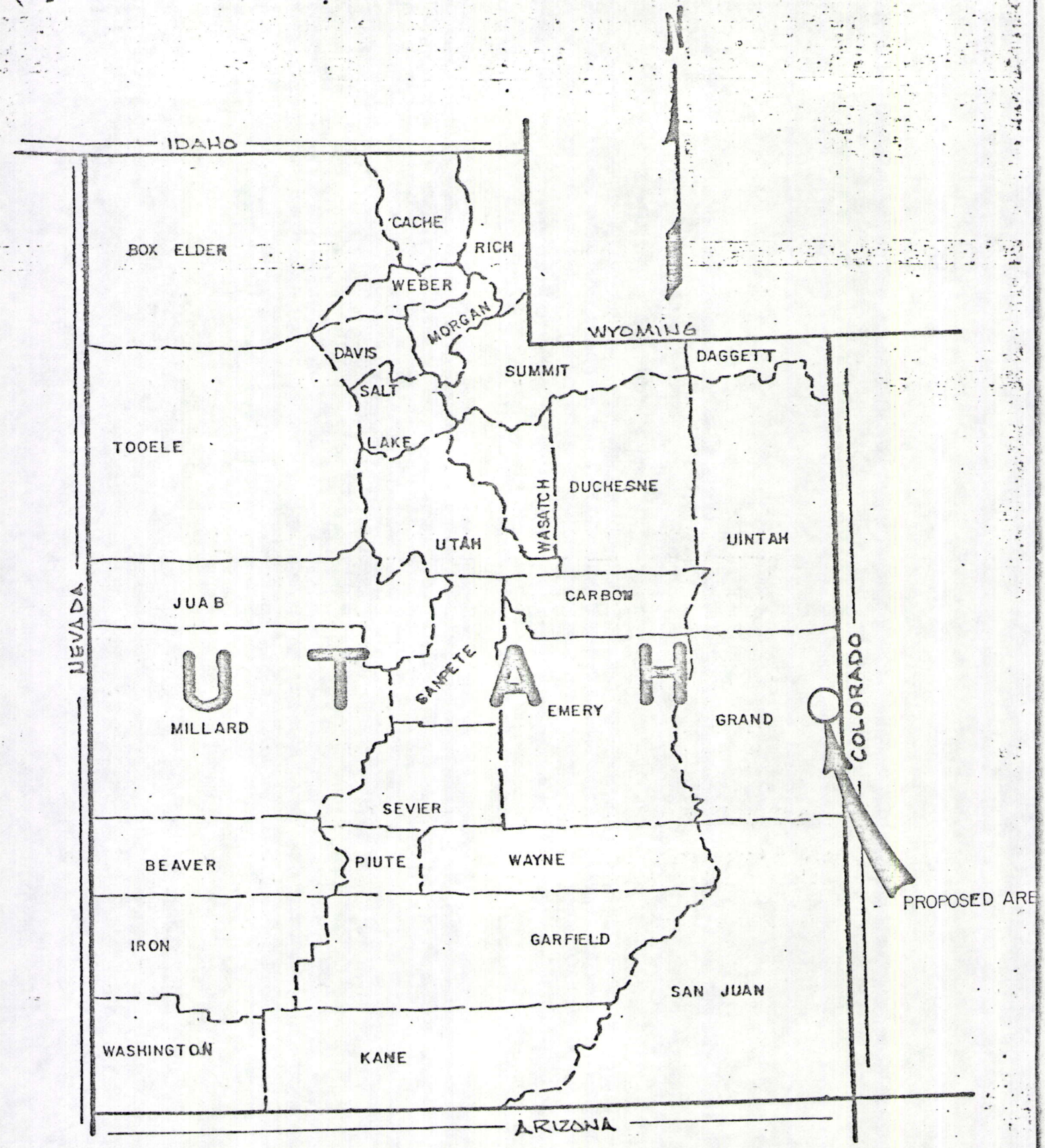
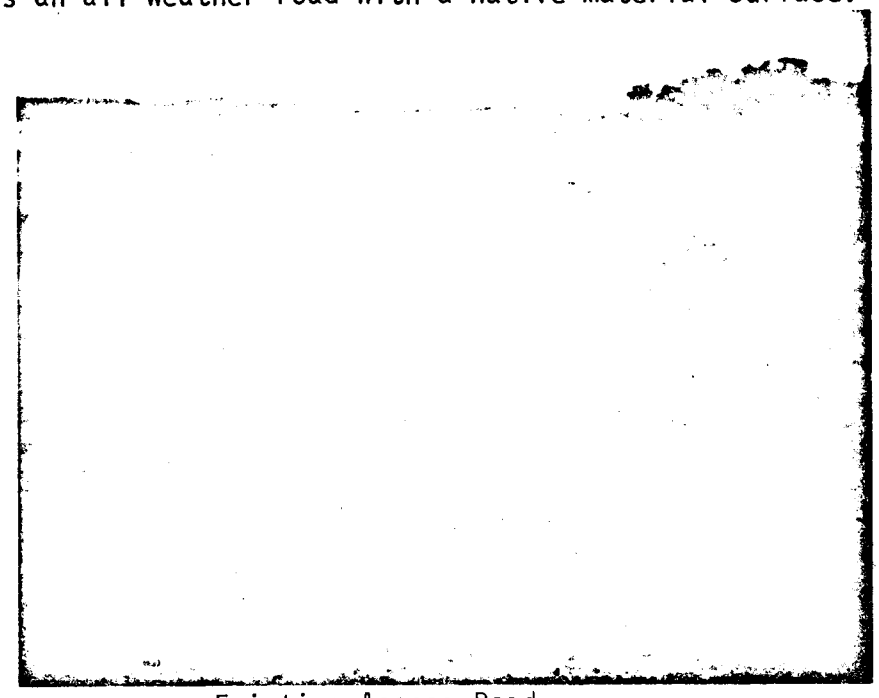


Figure 1
PROJECT LOCATION

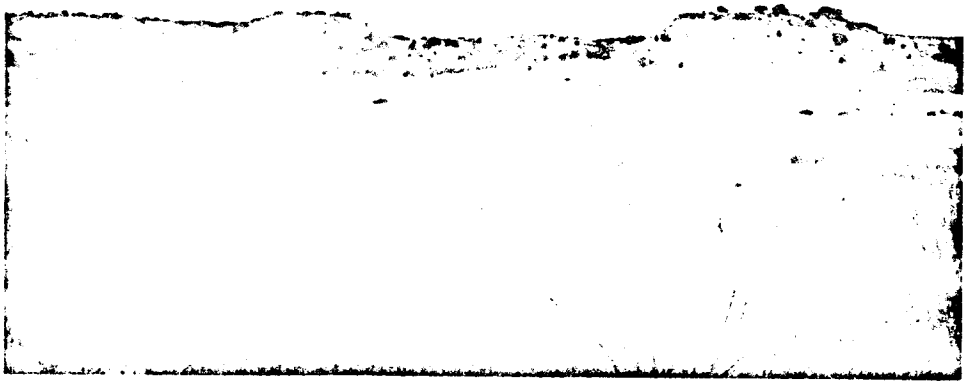
A. Access

Access into the area would be via an existing county road that runs between Harley Dome and Westwater, Utah (Figure 2). It is an all weather road with a native material surface.

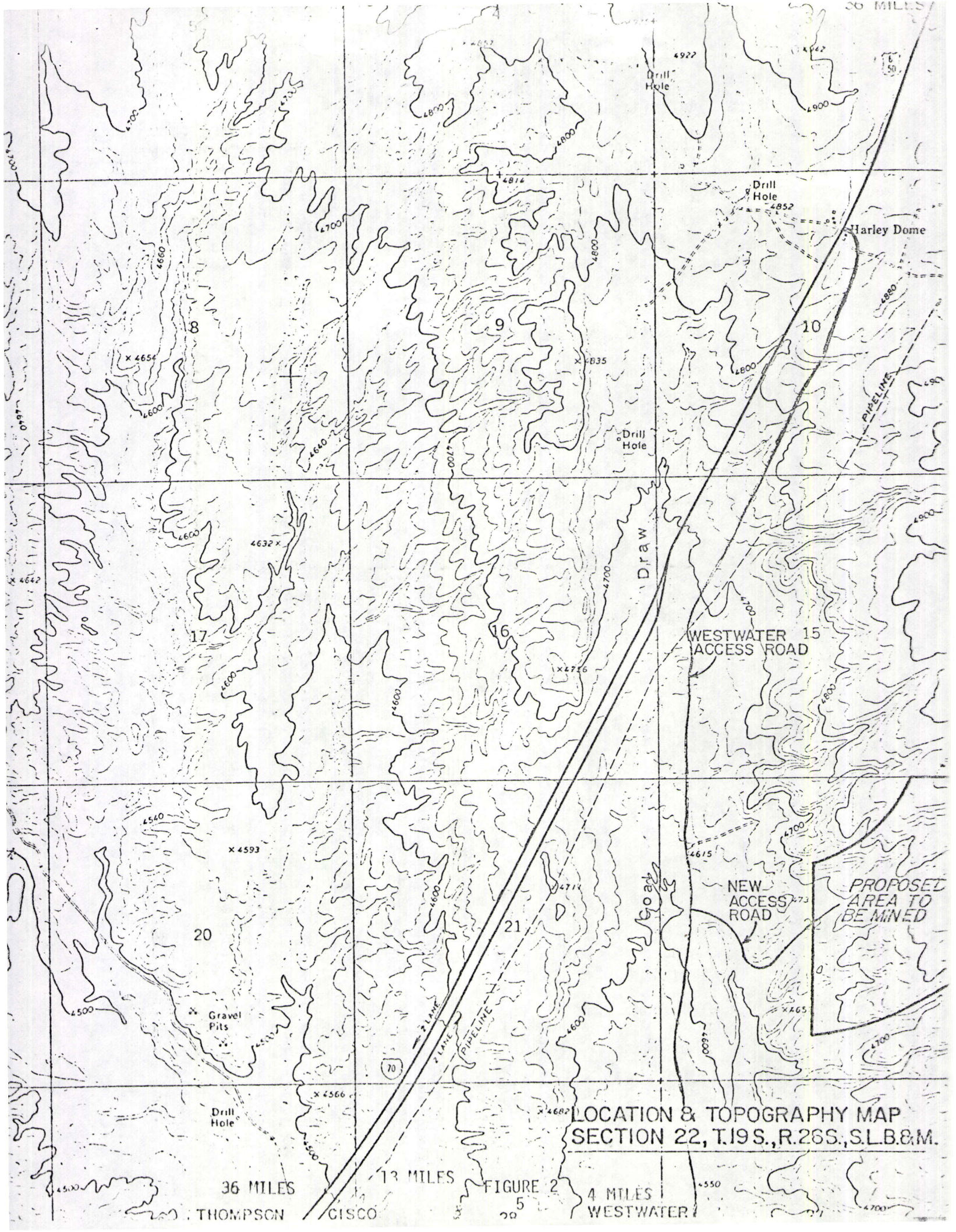


Existing Access Road

It would be necessary to construct approximately one-half mile of additional road to provide access from the existing county road to the mining area. The road would be maintained entirely by Baker Associates, Inc. The road would be 24 feet wide and constructed of native material with a maximum gradient of 3 per cent. The access road would require 1.5 acres of land.



Area where additional access road will cross.



LOCATION & TOPOGRAPHY MAP
SECTION 22, T.19S., R.26S., S.L.B.&M.

FIGURE 2

B. Anticipated Mining Methods

The mining method would be strip-mining requiring a cut and fill process. The general sequence of the mining process would be as follows:

a. Removal of all vegetation (juniper trees, brush, etc.) on an area large enough to accommodate the initial mining operation (approximately 15 acres). The large trees would be stockpiled to be used in the reclamation process for erosion control and wildlife habitat.

b. Remove and stockpile any topsoil.

c. Remove all overburden.

d. Remove and stockpile the raw humate material.

e. Place overburden in excavation

f. Replace topsoil.

g. Enrich the topsoil with humate material.

h. Replant the area with a recommended seed mixture.

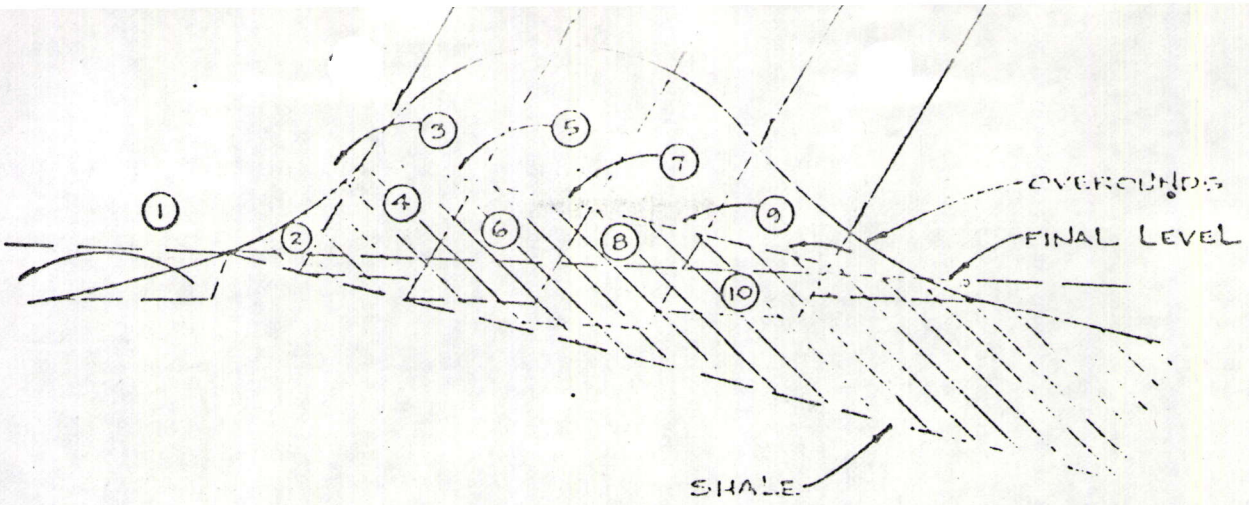
Each of the above items would be a continuing process as the mining expanded into the area.

The initial cut for the open pit excavation would be on the exposed humate seam and would traverse the side of the ridge where the humate is exposed. The cut would be approximately 500 feet in length and 100 feet wide. Any overburden removal required on this cut would be placed on the slope directly below the humate seam and serve as a pad to facilitate the mining operation. After the humate is removed from the initial cut, the next area to be mined would be cleared of brush and topsoil and stockpiled at the end of the proposed cut. The exposed overburden would then be bulldozed into the previously mined section. (Each cut and fill operation would involve approximately 15 acres.) This would provide access to the next block of humate to be removed. This process would continue throughout the mining operation (see Figure 3).

The strip mining would be accomplished by mechanical methods using dozer tractors, rippers, front-end loaders, etc. A small amount of blasting may be required, but would be minimal.

C. Transportation

The raw material would be stockpiled at the mining site and then hauled 5 miles along a county road by truck to the Westwater rail siding; loaded on train cars and then transported to California for final processing.



TYPICAL CUT & FILL METHOD DIAGRAM

N.T.S.

STEP

(1) Initial Cut (Preparation)

(2) Excavate Shale

(3) Overburden placement in bottom of (2)

(4) Excavate Shale

(5) Overburden placement in (4)

(6) Excavate Shale

Etc. (7), (8), (9), (10),

Figure 3

The Grand County Commission has indicated that Grand County would maintain the access road to the Westwater railroad siding during the mining operations.

At the beginning of the mining operation rail loading would take place approximately once a month. This would occur at the time the railroad delivered empty cars at the Westwater siding. The siding can accommodate 25 cars at one time. Once the cars were on the siding transport of the humate material, from the on-site stockpile, would occur around the clock. This would require approximately 18 hours with trucks leaving the mining site approximately every 20 minutes. Trucks would have at least a 20 cubic yard capacity. The material would be dumped at the siding and either loaded with a front end loader or by conveyer.

After approximately two years of mining, truck transport and loading would occur approximately twice a week and would follow the same sequence as mentioned above. At maximum anticipated output, 25 cars would be loaded ten times a month.

D. Employees and Support Facilities

The mining operation would employ approximately 10 full time people which would include two laborers, two operators, four truck drivers, one superintendant, and one maintenance man.

The actual mining of the humates would be by contract. Bids for the humate removal would be solicited from local contractors with the capabilities of performing the necessary work.

Due to the short term projection of the initial mining operation, there would be no permanent structures erected on or near the project site. Temporary buildings required would be two 40 foot utility trailers and one mobil office, 20-30 feet in length. No housing would be allowed on the site (permanent or temporary), nor would permanent utilities be necessary. All electrical needs would be supplied from portable generators. Sanitation facilities would consist of State Health approved privies and culinary water would be hauled from Green River, Utah or Fruita, Colorado.

The support facilities for the mining operation would require approximately four acres of land. This area would be located directly east of the west boundary of the project limits. It has a relatively flat profile and is obscured from view from the Westwater access road and I-70 Highway and would require minimal excavation to accommodate the support facilities.

E. Rehabilitation and Reclamation

Approximately 15 acres would be mined at one time followed by reclamation. Reclamation would consist of smoothing the backfill areas and placing a four inch layer of humate over it. Any topsoil and brush that had been stockpiled would then

be replaced over the humate layer and then properly seeded. (See Appendix E for seed list). It is important to note that only a small amount of native topsoil would be saved during the mining operation as the topsoil above the overburden is shallow and would be difficult to remove.

The final seeding process would take place each fall. Fall scheduling would allow a sufficient area to be mined and assure a permanent contour and relief of the area to be reclaimed.

Contouring ditches on the slope would be required to prevent erosion. They would be placed at 20 foot intervals and would be 1.5 feet deep and 4 feet wide and traverse the entire length of the exposed area.

Major natural drainage structures would not be disturbed, therefore, off site drainage or erosion contour structures would not be necessary, with the exception of a drainage structure on the access road.

F. Duration of Project

The mining operation is projected for a four year period. Any extention of this time limit is beyond the scope of this assessment and would have to be considered separately. If the demand for the humate and economic condition justified additional mining, then additional environmental assessments would be necessary at that time. Sale of the humate material is discretionary with the BLM, therefore, the initial sale doesn't commit the BLM to any additional sales.

G. Alternatives to the Proposed Action

1. Alternate Sites

One alternative would be to mine one of the other exposed humate seams found in the Upper San Rafael Valley or the Coal Cliff area of central eastern Utah.

In considering alternate sites for humate development, several factors were considered.

First, the humate material is exposed, or at a shallow depth, at the proposed site. Though the material is available at greater depths over wider areas, underground mining would be necessary. Considering the market value of the humates underground mining methods would not be economically feasible.

Second, the areas that may be underlain elsewhere by the same quality, humate materials are covered by mining claims, presumably filed for possible development of uranium. Development of humates, a saleable material, is legally impossible without a difficult and time consuming negotiation with the claimant. Such negotiations have already been conducted for the proposed site.

2. Alternate Mining Methods

The humate seam could not be mined using conventional tunnel mining with room and pillar mining methods. This type of mining would not be feasible due to the shallow thickness and unstable condition of the overburden.

3. Alternate Rail Loading Site

An alternative to loading at Westwater would be to truck the humate material from the on-site stockpile to a rail siding at Cisco, Utah, approximately 20 miles away. This would require the haul trucks to travel 3 miles of the county road to I-70 and then 17 miles of Interstate to the Cisco siding. This alternative would not be economically feasible. However, it would eliminate most of the conflicts with river users.

4. No Action Alternative

This would result in not mining the humate material and any impacts, real or imagined, of the proposed action would not occur.

III. DESCRIPTION OF THE AFFECTED ENVIRONMENT

A. Non-Living Components

1. Climate and Air Quality

The climate of the area is a semi-arid desert type. It is typical of the lower plateau region of Southern Utah (5,000 feet elevation). Temperature ranges in this region are exteme with summer temperatures reaching highs of 100^{o} - 105^{o} F. and winter temperatures reaching lows of 0^{o} to -20^{o} F.

The average seasonal temperatures are:

Season	Lows	Highs
Summer	$50^{o}/60^{o}$	$70^{o}/105^{o}$
Winter	$-20^{o}/15^{o}$	$-10^{o}/50^{o}$

The average annual precipitation for the area is 6 inches. This precipitation is the lowest recorded in the entire Book Cliff Region. The majority of the annual precipitation results from summer thundershowers (2 to 5 inches). The winter months are typically dry with only small amounts of measurable moisture being recorded (0 to 5 inches). Snow in this region is found on the ground an average of 12 days per year.

The humidity of the area averages between 10 per cent - 20 per cent in the summer and 30 per cent - 40 per cent in the winter.

The area, climatically, is generally referred to as being a harsh and undesirable place to live.

Generally, air quality for the area is good to excellent. There are periods during the spring and fall when gusty winds create local dust problems. The close proximity of I-70 to the area would be expected to raise the background levels of SO_2 and NO_2 above anticipated ambient levels.

Visibility in this area exceeds 50 miles the majority of the time. Visibilitiy restrictions and yearly variations in visibility are due primarily to natural causes.

2. Topography: The topography of the Harley Dome/Westwater area is generally flat, rolling hills, intermittent with numerous rock outcroppings and steep, almost vertical, rim structures. The entire area is heavily eroded and laced with numerous gullies, washes and canyons.

General topography on site looking west.

The project site is located in an area where wind and water erosion has exposed the humate seam to the surface. The relief in this location is steep with deep washes traversing the entire area. The elevation ranges from 4,600 feet to 4,850 feet in approximately 1/2 mile (9 per cent slope).

3. Soils

The majority of the proposed area to be mined has shallow, well drained, moderately rapidly permeable soils (soil mapping unit 413 - Shalako gravelly sandy loam, dry, 3 to 8 per cent slopes). This soil is derived dominantly from sandstone and the present vegetation is mainly Utah juniper, shadscale, Wyoming big sagebrush and rabbitbrush.

Typically the surface is covered with 15 per cent channers and 30 per cent gravels. The surface layer is typically gravelly sandy loam 1 inch thick but ranges to include very fine sandy loam. Reaction is mildly alkaline to strongly alkaline (PH 7.9 - 9.0). The subsoil is commonly fine sandy loam, very fine sandy loam and loam, three inches thick. The substratum is commonly gravelly loam, sandy loam and fine sandy loam over sandstone at a depth of 10 inches. Depth of sandstone ranges from 5 to 20 inches. Reaction is moderately alkaline to very strongly alkaline and it is moderately to very strongly calcareous.

Surface runoff is slow and the hydrologic group rating which refers to soils grouped according to their runoff producing characteristics or the inherent capacity of soil base of vegetation to permit infiltration has a high runoff potential due to the limiting depth of the soil and rock outcrop. The hazard of water erosion is slight and the potential erodibility of the soil is low to moderate. The wind erodibility group (WEG) for the gravelly and stony surface types are not subject to wind erosion (WEG = 8). The WEG for fine sandy loam, sandy loam and very fine sandy loam texture is 3 which has a erodibility and estimated soil loss (I Value) of 86 tons/acre/year.

The Shalako soils are in a semidesert shallow loam (Juniper-pinyon) ecological site.

There are also very small areas of the Ravola family soils (soil mapping Unit 8). This soil is found along drainage channels and on broad fans and flats. These soils are very deep and well drained. They are moderately to strongly saline. The present vegetation is greasewood, shadscale and galleta grass. Surface textures are silt loam or silty clay loam. The underlying layers are silt loam or silty clay loam with thin strata of fine sandy loam and loamy fine sand. They are moderately to very strongly alkaline and are moderately to very strongly calcareous.

Runoff is moderate to slow and the hazard of water erosion and potential erodibility is moderate to severe. These soils are susceptible to gully erosion. The hazard of wind erosion is slight. The wind erodibility group rating is 4L with an I value of 86/tons/acre.

The ecological site for this soils is Alkali Flat.

4. Geology

Geologically, the area is located on the south flank of the Grand River Valley in a region dominated by anticline - syncline structures that trend in a sub-parellel fashion to form the northwestwardly plunging Uncompahgre Uplift, the major structural feature.

The specific area is located in between the Harley Dome - Miller Creek Anticlines and the Danish Flat Syncline (all trending generally to the northwest). Local relief of this area is in the order of several hundred feet. The exposed strata range from Upper Jurassic shales, mudstones and siltstones (Brushy Basin Member of the Morrison Formation), which are present in the southeast portion of the subject area, to Lower and Upper Cretaceous sandstones (Burrow Canyon Formation and the Dakota Sandstone respectively). The Dakota Sandstone is present in the northwest portion and is the capping formation on the ridge in the area of interest.

The humates occur as black to gray carbonaceous shales which are interbedded (along with a few very thin lenticular coal beds) within the upper part of the Dakota Sandstone. The chemical composition of these humates is shown in Appendix A.

Humate seam appears in center of photo.

5. Water

Water is a scarce commodity, but is responsible for the majority of the erosion in the area. Summer thunder showers common to the area account for the majority of the water supply (6 inches annually).

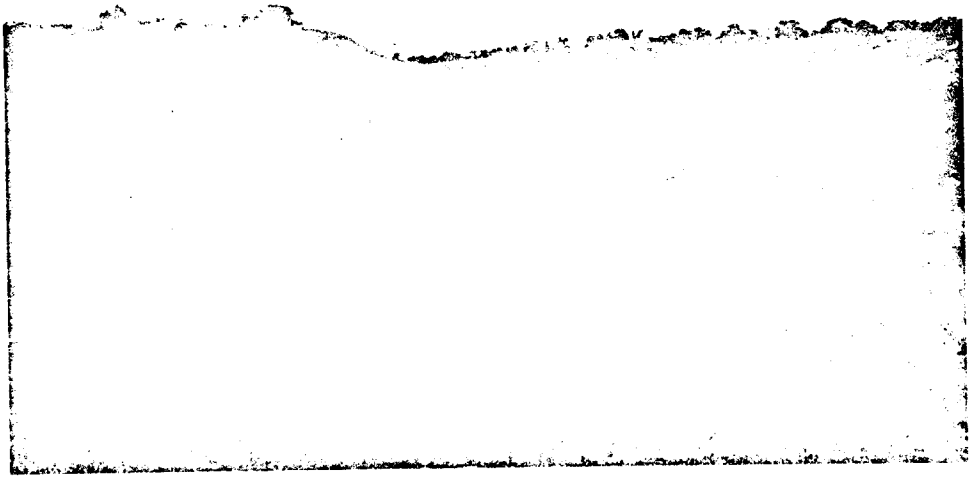
Small collection ponds constructed in wash bottoms provide a limited supply of water for livestock and wildlife. However, this supply is not reliable and grazing permit users must haul water when grazing the area.

There are no live water sources or stock ponds on the proposed project site.

B. Living Components

1. Vegetation

Lower Flat Areas



Lower Flat Areas.

Vegetation on this area of the project is predominately brush and grass cover. Sagebrush, Mormon tea, shadscale, salt grass, cheatgrass, and snakeweed are found here in relative abundance. Pinyon-juniper stands are sparse throughout this area.

Slope

Light stands of juniper are found on the steep sides of the numerous gullies. The brush and grass concentration is less than in the lower flatter areas and can be found only in isolated protected areas.

Upper Area

Upper Area

Relatively heavy stands of pinyon-juniper are found on the higher elevations of the project site. In these areas, the grass cover, as well as the browse, is sparse with only isolated grass and brush clumps being found where sufficient soil has accumulated to allow for plant roots to hold. Wind erosion is predominent in this area. There are no endangered plant species located on or near the proposed project site.[1]

2. Wildlife

The major big game species of the area are mule deer and mountain lion which use the pinyon-juniper woodlands primarily during the winter months. Other important wildlife species include golden eagles, marsh hawks and red-tailed hawks. Black-tailed jackrabbits and desert cottontail rabbits are abundant. Coyotes are commonly seen and occasional bobcat sightings are reported. White-tailed prairie dogs are fairly common and are often associated with burrowing owls in the area. The kit fox has been sighted in the Cisco area and is considered an "unique" species by Utah Division of Wildlife Resources. Many species of small mammals, birds, reptiles and amphibians occur in the humates mining area. A complete list of wildlife species which occur in the area may be found in the Book Mountain URA.

The lower portion of the proposed project site was designated as potential antelope habitat in the Book Mountain URA. A reintroduction of antelope could occur with the recommendation of BLM and UDWR.

No threatened or endangered wildlife species are known to occur in the proposed mining area.

C. Human Values

1. Grazing

The area is part of the Harley Dome Sheep Allotment. The permittee is presently Emmett Elizondo, P.O. Box 507, Loma, Colorado. The area is designated to grazing from January 1st to May 1st (4 months); the grazing unit encompasses 27,600 acres of land.

23,040 Acres - Public
3,840 Acres - State
720 Acres - Private

27,600 Acres - Total

The total grazing allotment designated for the area is 3,070 Animal Unit Months (AUM's). Presently only 951 AUM's of the total are authorized with 2,199 AUM's being held in reserve pending better range conditions.

1 Lois Arnow, Univ. of Utah Biology Dept., Salt Lake City, Utah

The immediate project area has not been grazed for a number of years because of lack of water. However, field inspections indicate reasonable grass and browse cover on the project site with an estimated grazing potential of 5-10 AUM's for the four month grazing season.

2. Mineral Uses

Other mineral commodities in this area are oil and natural gas. Both the Brushy Basin Member of the Morrison Formation and the Dakota Sandstone are known to be producing horizons. The Harley Dome has also been known to produce quantities of helium gas (Salt Wash Member of the Morrison Formation and the Entrada Sandstone).

Two attempts were made in the 1950's to develop oil and gas in the general area of the project site. The two wells fall within a 2 mile radius of the proposed mine, both were plugged and abandoned.

The oil and gas rights associated with the project area are presently under lease to Beard Oil Company, (Lease #U-23866) of 2,000 Classen Center Suite #200 South, Oklahoma City, OK., 73106. The lease is a 10 year duration and were due to expire in April 1, 1980.

The mineral rights of the proposed project are under claim by Baker Associates of Richfield, Utah. Agreements betwen Baker Associates and Westwater, Inc. have been reached, which would allow for the humate removal without jeapordizing the mineral rights of the associated project area.

3. Visual Resources

The visual resource of the proposed are is basically a grass-brush cover with light stands of pinyon/juniper scattered throughout. The area has a smooth rolling appearance. Rock outcroppings are found on the higher elevations and at the rims of the larger ravines that traverse the project site. (See Appendix G for visual contrast rating worksheet.

4. Recreation

The area is designated as having site-seeing qualities with some backpacking potentials. Other recreation uses are limited due to the extreme climate conditions throughout the year. The project is located adjacent to the main access road into the Westwater boat launching ramp which is used for float trips down the Colorado River.

The area affords some limited hunting potential such as deer, chuckars, morning doves and cottontail rabbits. However, the majority of these game animals utilize the habitat nearer the Colorado River.

There are two access routes off I-70 into the Westwater boat launching ramp. River use through Westwater Canyon, a 17 mile stretch of whitewater, has been near 10,000 passenger days the last several years.

The predominant use of the east Westwater access road is by river users coming from Colorado and users from the west who are not familiar with the unmarked west access road. People coming from the west who become familiar with the west access road invariably use it as it is shorter and not as steep. For those persons unfamiliar with the west access road it can be somewhat tricky to get onto it from the Interstate highway.

A quick review of private permits issued revealed that 56 per cent of the users came from Colorado and eastern states, 44 per cent from Utah and 1 per cent the western states.

There are 20 commercial river companies permitted for Westwater Canyon. Of these, all but two of the active companies originate trips from Colorado. Two other active Colorado companies launch at Loma and take out at Cisco. The remainder use the west access route.

Westwater river use is controlled so traffic related to this use will not be changing significantly. Basically, there are three commercial launches daily, which may generate 2 to 3 vehicles per launch per company or a maximum total of about 9 vehicles pertaining to commercial use. Private use will be limited to 35 people Sunday through Thursday and 75 people on Friday and Saturday. The 1982 season will be the first year with the new system so vehicle numbers are not certain. It is estimated that about nine vehicles per day related to private use Sunday - Thursday and up to 19 vehicles per day on Friday and Saturday.

The one variable which may show an increase, in vehicles, in years to come is river use originating at Loma, Colorado and terminating at Westwater Ranger Station. This use is gradually increasing. Presently approximately 50 trips launch at Loma and take out at Westwater Station. Each trip is probably represented by two vehicles.

It should be noted that each trip whether in Westwater Canyon or Ruby Canyon in Colorado involve a vehicle shuttle to the takeout at Cisco or put in at Loma. A typical Westwater shuttle involves driving at least two vehicles twice over the west entrance road.

5. Wilderness and Wild and Scenic River

The proposed project is not within a wilderness study area (WSA) or appeal area. WSA's UT-060-116, UT-060-117, and UT-060-118 are approximately five miles south of the proposed mining site.

The portion of the Colorado River near the proposed rail load-out site has been proposed as a "Scenic River" under the "Wild and Scenic River Act of 1968". The study was completed in 1979 and Congressional action is pending.

6. Cultural

The University of Utah conducted a survey of the proposed site and found that one historic and six prehistoric sites were located within the boundaries of the proposed action. The abstract of their findings is found in Appendix H.

7. Socioeconomics and Land Use

Sheep grazing and river recreation are the major industries in the area. The estimated value generated from the Harley Dome grazing unit in 1980 was $12,363,00 (13.00/A.U.M.) or $0.45/acre.

The Cisco area has some limited commercial potential. The town had a population of 6 people in 1973. Their income was generated from a small cafe and gas station. The cafe and gas station are presently closed and would require considerable repair and clean-up before they could be re-opended. Also, the construction of I-70 has caused the major traffic pattern to bypass Cisco.

Westwater River users purchase goods and services from Moab, Green River, and Grand Junction on their way to and from the site. Commercial passengers also purchase the services of river outfitters, most of which have a local base of operations. The estimated importance of Westwater river use to the three communities is presented in Table 1.

TABLE 1

Local Economic Importance of
Westwater River Use*

	Green River	Moab	Grand Junction
Employment (Part and Full Time)	12	17	20
Income	88,500	416,000	522,000

*Figures come from the Westwater Wilderness Report.

The area has no farming potential as soils are shallow and heavily eroded and the climate is too harsh for crop production.

8. Paleontology

The deposits to be mined for humate contain a fossil flora that is very important scientifically. This fern-angiosperm flora from the Lower Cretaceous Dakota Sandstone formation associated with the project area has been under study for some time. It is one of the few paleofloras which illustrate an admixture of an older Jurassic-Wealden floristic type with a modern angiospermous floral aspect.

Because of the scientific importance of the humate seam and independent study of the area was made by William D. Tidwell, Professor of Botany, Brigham Young University. An abstract of his findings are found in Appendix F.

IV. ANALYSIS OF THE PROPOSED ACTION AND ALTERNATIVES

A. Non-Living Components

1. Climate and Air Quality

There would be no discernible impact on the climate or air quality with the exception of some localized dust during the mining operation.

Dust would be present in the immediate area during the removal of the overburden but would subside once it had been removed. The humate removal would produce little or no dust as the humate would be shipped in raw state (no crushing before shipment). Truck travel on the access road and the road to the Westwater rail siding would create a localized dust problem.

2. Topography

The topography in the vicinity of the actual mining operation would change once the humates were removed. The nature of an open pit mining operation would make it necessary to remove the existing overburden, including the protective cap rock structure. During the mining process, some of the smaller gullies and washes would be filled in. Immediately after the mining and backfilling had been completed, the area would have a flatter more rounded appearance.

3. Soil

Soil on the project area would be removed to gain access to the rock overburden and humate material. It would be difficult to keep the existing soil separate from the underlying material as the soil depths are shallow and not uniform over the entire area.

The soils above the humate seam have a sandy texture and are highly susceptible to wind erosion.

The heavier silty clay soils found below the project area would remain basically unchanged except for the area encompassed by the access road. Any soil replaced after the mining operation would be subject to wind and water erosion until new grass and brush were sufficiently rooted to protect the area.

4. Geology

No discernible impact.

5. Water

It is anticipated that until the area has sufficient grass and brush cover to prevent erosion, any surface runoff water would carry some soils and silt from the project area. If the runoff is substantial (flash flood proporations) the water could reach the Colorado River. This condition would prevail even if the area were not mined.

Small amounts of rainfall and runoff would be dissipated into the ground as soon as it reached the lower flatter areas below the project site.

B. Living Components

1. Vegetation

At the end of four years, approximately 200 acres of pinyon-juniper vegetation would be altered. Not all 250 acres would be affected by mining. This amount represents approximately 3 per cent of the total pinyon-juniper stand in the immediate area.

2. Wildlife

A total of 200 acres of wildlife habitat would be altered from pinyon-juniper habitat to grass-brush habitat. The effect on the wildlife would be mitigated somewhat as the project would be spread over a four year period. The increased traffic associated with the project could increase the mortality rate of wildlife over the four years the project is in operation. This effect would be more pronounced during winter months as greater numbers of deer and predator animals utilize the area during this time.

The actual number of large animals displaced or destroyed would be small in comparision to the total, as the majority of these animals utilize the habitat in the deeper canyons near the Colorado River where water is more abundant. The migratory habits of the wildlife would be disrupted only slightly as the proposed project represents a small percentage of the total area.

C. Human Values

1. Grazing

The livestock operator would not sustain any reductions as a result of the mining operation.

2. Minerals

There would be no impacts to other mineral uses.

3. Visual Resources

The open pit mining operation would leave permanent scars on the visual quality of the area. Reseeding of the area would lessen the visual impact but the area would never completely blend into the surrounding landscape.

4. Recreation

There would be vehicle conflict with trucks during summer months along the access road to Westwater.

5. Wilderness and Wild and Scenic River

No impact.

6. Cultural

The mining operation would destroy the historical site and the six prehistorical sites located within the project boundary.

7. Socioeconomics and Land Use

Two hundred acres of marginal grazing land would be temporarily removed from the grazing allotment. This represents a negligible amount when compared to the total 27,600 acreage in the allotment. This area in the past has been grazed only occasionally, making the impact on grazing even less. With the removal of the pinyon/juniper stand and proper reseeding of the area, a more uniform grass and brush cover can be expected, which should have a positive effect on grazing in the area.

The project would employ 10 full time people for the life of the project. Using local average wages in the mining sector $203,000 of income would be earned annually from the project, some of which would be spent in Grand County, Utah* and Mesa County, Colorado.

The proposed humate mining could negatively affect local communities and river outfitters if the project caused either user expenditure patterns to change or total visitation to change. There is no reason to believe that user expenditure patterns would change because of the project. If some river users who would otherwise have visited the area do not because of the humate mining, river outfitters and to some dgegee local communities would be negatively affected. However, river use demand is expected to exceed permitting levels due to regional population growth. Under these conditions, a small decrease in demand would have no affect on local communities.

With a $.50/ton preextraction humate value, and a four year project life, the annual value generated by the humate removal would be $140,000 with a present value of $563,300 and an amortized value between $40,000-$50,000. If 10,000 recreation users were exposed to the mining on their way to access the river at Westwater, the average recreation value of people using the river would have to decrease $14 during the project life, and $4-$5 during reclamation, for the project not to be economically efficient.[2]

This can be interpreted as river users would have to be willing to pay an average of $14/trip not to be exposed to the mining activity when accessing Westwater, and an average of $4-$5/trip not to be exposed to the reclamation work, for the project not to be desirable.

*U.S. Dept. of Commerce, Bureau of Economic Analysis Regional Economic Information System.

2 A 7 3/8 discount rate was used as recommended by the U.S. Water Resource found in Federal Register (45 CFR 70167) and a 50 amortization was used as a longer amortization period would have little affect on the results.

8. Paleontology

The fossil flora in the mining area would be totally destroyed eliminating the opportunity to gather valuable scientific information.

V. RECOMMENDATION FOR MITIGATION OR ENHANCEMENT

A. Non-Living Components

1. Air Quality

During the time the trucks are hauling the humate material to the rail siding water should be applied to the road to control dust. It may also be necessary to control dust at the mining site, if it exceeds the anticipated levels.

2. Soils and Water

Erosion control should be emphasized during all phases of the mining and restoration operation. Water control structures (drainage ditches, detention dams, burm ditches, etc.) should be employed to prevent erosion and to protect soils until the vegetative cover is sufficient to prevent soil erosion.

The vegetation removed from the site should also be stockpiled and redistributed over the recontoured and reseeded surface. This vegetative cover should also be used to cover the exposed stockpiled soil in order to minimize the erosive forces of wind and water.

All drainage ways and washes should be reconstructed when surface restoration occurs and contain appropriate erosion control structures as approved by the BLM.

All roads constructed should have provision for drainage and erosion control as approved by BLM.

B. Living Components

1. Vegetation

Reclamation should take place concurrently with mining. As soon as humates are removed in one section, reclamation should commence.

The operator should seed each site with a BLM approved seed mixture. See Appendix E for recommended mixture.

Seeding should occur in the fall or spring to coincide with maximum soil moisture.

If seeding is unsuccessful as determined by an authorized BLM inspector, the operator shall repeat the process until a successful reseeding has occurred.

2. Wildlife

The disturbed areas should be reseeded as soon as possible to minimize the effect of wildlife habitat removal. The reclamation process should be a continuing process and a planned integral part of the total mining operation.

Downed trees should be stockpiled in several locations in order to provide cover for small mammals, birds, and reptiles.

C. Human Values

1. Minerals

No mining should begin until the Division of Oil, Gas, and Mining of the State of Utah approves a mining plan.

2. Recreation

The conflict with truck traffic and recreational traffic into Westwater could be mitigated in several ways.

a. The narrow stretch of road which drops down into Westwater Wash should be widened and turnouts constructed so that passage of cehicles is allowed.
b. Where the road goes under the train tressel it should be made into two lanes, a new lane dropping into the wash. This was done several years ago when gravel was being hauled out of the river near Westwater.

c. A traffic caution light should be put on the tressel which would be activated by the humate haul trucks when approaching the tressel and deactivated after passing.

d. Proper road signing to indicate truck traffic.

e. Encourage river users to use the west access off I-70.

3. Cultural

Proper coordination between the BLM, State Historical Preservation Office, and the applicant should be maintained. Advanced notice should be given to all parties involved before any mining occurs in those areas that have archaeological significance.

The lead time of the notice should be of sufficient duration to allow additional field research on those sites that need to be studied in greater detail.

4. Paleontology

See Appendix F (Tidwell Report). Increased scientific knowledge would be gained if samples of fossilized flora are properly collected.

During the process of mining the humates, any fossils present would be destroyed. Mitigation of this loss could be achieved by using the following two methods:

a. Concentrated collecting effort in the area to be mined. This should be done in conjunction with a bulldozer removing overburden, perhaps during exploration. At this time the sandstone forming the overburden should be investigated for petrified woods. They should be collected whenever they were encountered along with any pertinent data.

b. This method would follow the first. It would be utilized to collect the fossil materials during the process of mining at designated areas. In these areas after the upper humate layer is removed down to the ash bed, the fossils would then be collected from the ash.

VI. RESIDUAL IMPACTS

A. Non-Living Components

1. Air Quality

Some dust would be present in the immediate area during the removal of the overburden but would subside once it had been removed.

2. Topography

The topogarphy in the vicinity of the actual mining operation would change once the humates were removed. During the mining process, some of the smaller gullies and washes would be filled in. Immediately after the mining and backfilling had been completed, the area would have a flatter more rounded appearance.

3. Soils

Any soil replaced after the mining operation would be subject to extensive wind and water erosion until new grass and brush were sufficiently rooted to protect the area.

4. Water

It is anticipated that until the area has sufficient grass and brush cover to prevent erosion, any surface runoff water would carry some soils and silt from the project area. If the runoff is substantial (flash flood proporations) the water could reach the Colorado River. This condition would prevail even if the area were not mined.

B. Living Components

1. Vegetation

At the end of four years approximately 200 acres of pinyon/ juniper vegetation would be altered. This amount represents approximately 3 per cent of the total pinyon/juniper stand in the immediate area.

2. Wildlife

The total of 200 acres of wildlife habitat would be altered from pinyon/juniper habitat to grass/brush habitat. The increased traffic associated with the project could increase the mortality rate of wildlife over the four years the project is in operation.

The actual number of large animals displaced or destroyed would be small in comparision to the total. The migratory habits of the wildlife would be distrupted only slightly as the proposed project represents a small percentage of the total area.

C. Human Values

1. Visual Resources

The open pit mining operation would leave permanent scars on the visual quality of the area.

2. Recreation

There would be vehicle conflict with truck traffic during summer months along the access road to Westwater.

3. Cultural

The mining operation would destroy the historical site and the six prehistorical sites located within the project boundary. However, the sites would be inventoried prior to mining and this would increase the scientific knowledge in this area.

4. Socioeconomics and Land Use

Two hundred acres of marginal grazing land would be temporarily removed from the grazing allotment. This represents a negligible amount when compared to the total 27,6000 acreage in the allotment. With the removal of the pinyon/juniper stand and proper reseeding of the area, a more uniform grass and brush cover would be expected, which should have a positive effect on grazing in the area.

5. Paleontology

Increased scientific knowledge would be gained if samples of fossilized flora are properly collected.

VII. SHORT TERM USE VERSUS LONG TERM PRODUCTIVITY

The mining of 200 acres of humate would permanently impair the visual quality of the area by changing the appearance from natural state to man made.

The long term effects on grazing would be greater range productivity due to a higher percentage of grass and browse cover.

The economy of the area would increase. There would be more wages with a greater demand for goods and services during the mining operation. The duration would be short term, but would not be a boom economy because of the size of the project and its close proximity to Moab and Green River, Utah and Grand Junction, Colorado.

VIII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Two hundred acres of natural pinyon-juniper would be lost.

1.12 million metric tons of humate material would be exported from the area.

Six prehistoric and one historic archaeology sites would be inventoried.

Approximately 50 $\pm$ acres of prehistoric deposit containing fossil flora would be mined and destroyed.

IX. RECORDATION OF PERSONS, GROUPS, AND AGENCIES CONSULTED

The following is a list of individuals contacted during the preparation of the assessment.

Harold K. Kabayashi
President
WESTWATER, INC.

LaRel Baker
BAKER ASSOCIATES (Applicant)

Gregg Dawson
Range Conservationist
Moab District BLM

Richard N. Holmer
Contract Archaeologist
Univ. of Utah

William D. Tidwell
Professor of Botany (BYU)

Jeff Williams
Moab District

Colin P. Christensen
Area Manger, Moab District
Grand Resource Area

Daryl Trotter
Moab District (BLM)

Division of Natural Resources
Wildlife Division
Price & Salt Lake City, Utah

Gerald Turner
Attorny at Law
Salt Lake City, Utah

Lois Arrow
University of Utah
Biology Department

Ray Tibbetts
Grand County Commissioner
Moab, Utah

X. PUBLIC COMMENT ANALYSIS

The method of "Content Summary Analysis" was used to analyze the public comments.

In the following report quantative analysis precedes the qualitative analysis'.

Quantitative Analysis

Base Data

Sixteen comment letters were received. In addition, we received four requests for information which we responded to by sending a copy of the Draft EA. (A fifth request for information was accompanied by an unfavorable comment, this comment was changed to neutral after reviewing the Draft EA.)

Processed Data

The 16 comment letters were first divided into favorable/unfavorable categories. As a whole, comment was unfavorable as 14 of the 16 comments fell in this category. Two comments were favorable. Of the 14 unfavorable comments, one was from two business coalitions (Western River Guides Association and Utah River Guides Association), one was from a conservation organization (Slickrock Country Council), one was from a business (Sidewinder River Expeditions), and 11 were from individuals. All unfavorable comments were from local publics (13 from Moab, 1 from Green River).

Of the two favorable comments, one was from local government (Grand County), and the other was from a representative of a business (Balducci Oil Company), from out of state, Grand Junction, Colorado.

Synthesized Data

Unfavorable comment fell into four themes, listed in order of the level of concern: National Environmental Policy Act (NEPA) Requirements, Recreational Values, Pollution, and Other Values. Several distinct statements were made on each theme, so a coding system was used. The coding is marked in red on the comment, this ensures analysis is visible and traceable. Reliability is ensured by counting the statement the first time it appears in each comment and not counting repetitions later in the comment. (A coding index is attached).

The NEPA theme was divided into nine distinct statements. Forty-four unfavorable statements were made on the NEPA theme according to the following breakdown, listed in order of the level of concern:

11	Statements:	Inadequate Discussion of Alternatives
8	Statements:	Potential future expansion/major Federal action
7	Statements:	An EIS should be written
7	Statements:	Questioned economic need for Humates
3	Statements:	BLM should reject, if not then writen an EIS
3	Statements:	Negative impact on local economy/tourist and boating industry
2	Statements:	Questioned humates being saleable or leasable
2	Statements:	EA is inadequate
1	Statement:	Reclamation/Rehabilitation inadequately addressed
44		

The Recreational Value theme was divided into six distinct statements. Thirty-nine unfavorable statements were made on this theme according to the following breakdown, listed in order of the level of concern:

10	Statements:	Negative impact on Westwater's Wild & Scenic proposal
8	Statements:	Negative impact on Westwater's 'Wilderness' values
8	Statements:	Negative impact on historic recreational use of the area
7	Statements:	Heavy truck traffic on Westwater access road
5	Statements:	Conservation
1	Statements:	Mining and recreation not compatible
39		

The Pollution theme was divided into three distinct statements. Nine unfavorable statements were received on this theme according to the following breakdown, listed in order of the level of concern:

7	Statements:	Erosion into Colorado River, salinity
1	Statements:	Noise pollution
1	Statements:	Dust pollution
9		

The Other Value theme was divided into five distinct statements. Eight unfavorable statements were received on this theme according to the following breakdown, listed in order of the level of concern:

3	Statements:	Demands on water from Colorado River
2	Statements:	Water rights (to use river water for dust control)
1	Statement:	Inadequate study of historic and prehistoric resources
1	Statement:	Inadequate study of paleontological resources
1	Statement:	Inadequate study of impacts on wildlife
8		

Favorable Comment:

It was not necessary to code the two favorable comments, as only three statements were made: the development was compatible with their land use plan, it was good for the economy, and it would benefit the agricultural uses of the land.

Summary Data

Of the 16 comments received, 14 were opposed. The opposition was supported by 23 distinct statements which fell into four themes: NEPA, Recreational Values, Pollution, and Other Values. All comments were from local publics. One comment was from two business coalitions, consisting of the commercial river companies in Utah and the western United States. One comment professed to be the spokesman for 200 individuals (Slickrock Country Council). A third comment was from a business and was signed by three individuals. The remaining eleven comments were from individuals speaking only for themselves.

The two favorable comments were supported by three statements: the development was compatible with the County Land Use Plan, it was good for the economy, and it would benefit agricultural uses. One comment was from a local elected official, representing Grand County. The other favorable comment was a non-local business representative, though in close proximity to the proposal's location (Grand Junction, Colorado).

Qualitative Analysis

Favorable Comments

The comment from the Grand County Commission is important because it is made by an elected official. Its content is in disagreement with three statements made in the unfavorable category, regarding the effects on the local economy. While the Grand County Commission states it would be good for the economy, this is countered by the representative from the Western River Guides Association/Utah River Guides Association, a commercial river company, and one local individual.

The comment from the business representative in Colorado is based on his premise that agriculture is the primary use of the land. This is countered by 39 statements made in the unfavorable category, regarding the area's Recreational Values.

Unfavorable Comments

Of the 14 unfavorable comments, two obviously believed that the strip mining proposal was within Westwater Canyon itself. (Proposal was described in both cases, by Connie Blaine and Janet McVickar, as "in Westwater Canyon.") In addition, comments by Tom Rees and Karen Sue Nunn used this terminology, however, in both cases a comment was also received from their spouse (same surname and address) and the spouse was aware of the actual proposed location. Nine comments obviously knew the proposal was not within Westwater Canyon. In one comment this was undiscernable.

The comments demonstrate an obvious cooperative effort in five of the letters, meaning that statements are made in the same order, in similar terminology, and in format. While they are not form letters, they are probably the result of a meeting or something of that nature. These five letters are: Jacobs, Wallingford, Mary Rees, Warner and Nyer.

Conflicts between the favorable and unfavorable categories were discussed under favorable and need not be repeated here. There are no conflicts between the unfavorable comments themselves.

The quality of the distinct statements made in the four themes and "new" information will be determined by an interdisciplinary evaluation team. The attached forms list the statement categories, and then the supportive reasons expressed in the public's own language (direct quotes). This maintains the integrity of the response so its "quality" can be judged fairly. It is important to note that all response is valuable and must be considered. Decision makers need to be aware of all values and opinions, including those based on misunderstanding or lack of information.

One piece of new information came in the form of a Grand Junction Daily Sentinel article written by Gary Schwitz and published December 29, 1981. Potential future expension, perhaps large scale, is supported by the following quotes from his article: "If successful, the operation could show the way for other mines. Large deposits of humates are lodged in seams strewn across Western Colorado and Eastern Utah." "LaRel Baker, another partner in Baker Associates said the mine opening would create about 10 jobs and more as it was expanded."

QUALITATIVE ANALYSIS

Draft Humate EA

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
NEPA REQUIREMENTS			
Inadequate discussion of alternatives	"There must be a detailed discussion of alternative sites."	Michael Jacobs/Individual	1. Additional analysis has been added to the Final EA in the Alternatives Section.
	"The alternative to the proposed action were not fully considered."	Ken Sleight/WRGA & URGA	2. See response No. 1.
	"The EA does not adequately address the alternative sites in the Coal Cliffs and Upper San Rafael areas, and the exact nature of conflicts of these sites. Areas where the conflicts with sensitive recreational values are lower should be more seriously considered."	Lucy Wallingford/Slickrock Country Council (cc: SD Robison & Rep. Hansen)	3. See response No. 1.
	"Is it possible that these humates could be mined in another area where there would not be a serious conflict with the well established recreation users?"	Mary Rees/Individual	4. See response No. 1.
	"Is there no other place that this company could find humates, where perhaps the impact would not endanger an area with wild and scenic capability?"	Barbara Warner/Individual	5. Impacts to Wild and Scenic designation has been addressed in the Final EA.
	"I also understand that there are two other proposed sites from which to gather the humates."	Diana Chalmers/Individual	6. See response No. 1.
	"Are there other sites where the "humates" could be mined?	Pat Grediagin/Individual	7. See response No. 1.
	"Alternative sites at Coal Cliffs and Upper San Rafael Valley in Emery County, Utah, a region already impacted by coal development, should be thorougly investigated."	Nicholas Nyer/Business (Houck and Lashier)	8. See response No. 1

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
NEPA REQUIREMENTS			
Inadequate Discussion of alternatives	"There must be a detailed discussion in the IES of alternative sites in the Coal Cliff and Upper San Rafael areas, and the exact nature of conflicts with those sites."	Connie Blaine/Individual (cc: GOV. Matheson, UWA,SCC)	9. See response No. 1.
	"Are there alternative sites that could be considered?"	Janet McVickar/Individual	10. See response No. 1.
	"I might support stripmining for humates in some other area that isn't used for recreation, however Westwater Canyon is not appropriate."	Karen Sue Nunn/Individual	11. See response No. 1.
Potential Future Expansion/Major Federal Action	"The proposal calls for the strip-mining of only 200 acres, but is essential that the studies include the effect of adjacent potential future strip mining areas. This area would cover the entire area from I-70 to the Colorado River causing a much greater impact. This is clearly of major importance as it directly impact the river environment, the Wild and Scenic River designation and a host of other values."	Ken Sleight/WRGA & URGA	12. The issuance of a permit to mine the humate material is a discretionary action that BLM can revoke at anytime and does not commit the area to any mining beyond the 250 acres. The mining would not affect the "Scenic" designation proposal.
	"One issue of particular concern to us concerning this proposal is that the area, according to BLM, has the "potential" for the removal of 200,000,000 tons of humates which would involve 9 sections of land, or an area 25 times larger than the proposed mine. This potential expansion of that magnitude of a stripmine adjacent to a Wild and Scenic River proposal requires an EIS. BLM cannot assess the effects of this proposal by looking at it in piecemeal fashion."	Lucy Wallingford/SCC (cc:SD Robison, Rep. Hansen)	13. See response No. 12.

THEME/Statement	Reasoning	Who	EVALUATION TEAM:
NEPA REQUIREMENTS			
Potential future expansion/Major Federal Action	"Further I understand the present proposal is only a small portion of the total land area near Westwater with potential for the mining of humates." "Is there going to be an EIS on this proposal that would include data on the entire area for potential mining? If not, why?"	Mary Rees/Individual	14. See response No. 12.
	"By allowing the strip mining corporations to rob and plunder the earth, for, in this case, lignite coal, you are (purposefully?) allowing the rape of the land for even greater purpose late on down the line."	P.E.Straley-Grega/Individual	15. See response No. 12.
	"I am afraid if Westwater Inc. was given a permit to mine 200 acres, as they have requested, they would request an extension on that permit and end up stripmining up to 5,000 acres, which would have a drastic effect of river users."	Pat Gradiagin/Individual	16. See response No. 12.
	"According to the Draft EA of the project, the proposed mining is merely the first step in a far greater development in the immediate area, and could eventually affect the area to include 5,000 acres of disturbed landscape. Doesn't the true potential for development of mining at Westwater merit more thorough study than has been undertaken to date?"	Nicholas Nyer/Business (Houck & Lashier)	17. See response No. 12.
	"The EIS must look at the entire potential development of the area and not just the one proposal limited to strip mine "just" 200 acres." "Is BLM giving us a true representation of the big picture? Once an operation is begun it will be far more complicated to evaluate the effects of expansion."	Connie Blaine/Individual (cc:Matheson, UWA, SCC)	18. See response No. 12.

THEME/Statement	Reasoning	Who	EVALUATION TEAM:
NEPA REQUIREMENTS			
Potential future Expansion/Major Federal action	"This proposal has not as yet been preceded by a thorough and objective EIS, looking not only at the immediate area under question but the entire area potentially being considered for strip mining operations, and the total impact of such activity."	Janet McVickar/Individual	19. See response No. 12.
An EIS Should be Written	"At the meeting of the Utah River Guides Association on December 4, 1981 the members went on record as demanding an EIS be prepared as required by the NEPA. This project is indeed a major Federal action which will effect the immediate stip mined area, the river environment, the public's use of the area regarding recreation and boating, and a direct impact upon the boating and guiding industry." "And, as Utah chairman of the Western River Guides Association, I also ask that an EIS be accomplished. More study and more consideration of alternatives need to be considered."	Ken Sleight/WRGA & URGA	20. The BLM does not consider this a "major federal action" as defined in NEPA and departmental guidance.
	"An EIS should also be required because this has the potential of a major Federal action which will affect a proposed Wild and Scenic River. An EIS would address this issue as the EA does not." "The BLM Sunnysides Tar Sands documents have outlines for eventual full Public Participation Plans and EIS outlines as well. The surface disturbance and cumulative impacts are of the same magnitude as in this humates issue. Why is an EIS taken for granted at Sunnyside and not even considered at Westwater, especially considering the proposed Wild & Scenic status?"	Lucy Wallingford/SCC (cc: SD Robison, James Hansen)	21. See response No. 20. The mining would have no affect on the proposed "Scenic" designation of the river from Loma to Westwater. The magnitude of anticipated impacts from the Sunnyside Tar Sands far exceeds those of the humates proposal.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
NEPA REQUIREMENTS			
An Eis Should be Written	"If 40 feet of topsoil must be removed won't a large amount of it, and some of the humates, end up in the river? I do not believe that proper attention has been given to the possibility of water pollution as a result of the strip mining. Therefore I would like to see the BLM write an EIS which would address these and many more serious questions prior to an agreement with Westwater, Inc."	Barbara Warner/Individial	22. See "soil" and "water" sections in the EA.
	"At the very least an EIS is necessary before any destruction takes place."	P.E. Straley-Grega/Individual	23. See response No. 20.
	"I'd like to see a complete EIS done on this proposal, which I regard as a potentially major Federal action."	Pat Gradiagin/Individial	24. See response No. 20.
	"At the present time, further study of the impacts of strip mining of the low grand lignite coal (or carbonaceous shale) at this site is in order."	Nicholas Nyer/Business (Houck & Lashier)	25. Additional analysis of impacts has been done in the Final EA.
	"This proposal has not as yet been preceded by a thorough and objective EIS."	Janet McVickar/Individual	26. See response No. 20.
Questioned Economic Need for Humates	"I also question the economic need for this soil conditioner."	Michael Jacobs/Individial	27. Additional economic needs have been added to the Final EA.
	"The EA does not analyze the economic need of this soil condictioner. I understand, also, from a very knowledgeable source, that this humate material absorbs radiation and is highly radioactive. I fail to see how there could be much need for a fertilizer that is radioactive." "What is the economic need of this soil conditioner and what studies have been done on its' radioactivity? If there have been none to date, we request that there be one done as part of the EIS."	Lucy Wallingford/SCC (cc: SD Robison & Rep. Hansen)	28. See response No. 27. A sample was analyzed by Chemical and Mineralogical Services, Salt Lake City, Utah and found less than .001% U308. The humate material was sampled in the field with a scintillometer and the humate material averaged about 10 counts/sec. above background radiation.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
NEPA REQUIREMENTS			
Questioned Economic Need for Humates	"And, how econonically important is this project?"	Barbara Warner/Individual	29. See response No. 27.
	"The economics of this project ARE NOT WORTH IT."	P.E. Straley-Grege/Individual	30. See response No. 27.
	"Is the demand for this humate material substantial enough to warrant its extraction in an area noted for its scenic beauty and recreational possibilities?"	Nicholas Nyer/Business (Houck & Lashier)	31. See response No. 27.
	"What, really, is the economic need for the "soil conditioner" for which the humates are to be mined?	Connie Blaine/Individual (cc:Matheson, UWA, SCC)	32. See response to No. 27.
	"What is the real economic need for the humates? Does this justify such radical and irreversible treatment of such a truly unique recreational area?"	Janet McVickar/Individual	33. See response No. 27.
BLM Should Reject, If not, then Write an EIS	"I believe that the BLM should reject the proposal outright. If this proposal is not rejected, than the BLM should write a complete EIS to discuss impact on the area."	Michael Jacobs/Individual	34. See response No. 20.
	"If the BLM does not reject the porposal for these and other reasons we demand that a complete EIS be done to assure that the wisest decision has been made."	Lucy Wallingford/SCC (cc:SD Robison, Rep. Hansen)	35. See response No. 20.
	"In addition to expressing my whole hearted opposition to the proposal, I also want to request/demand that is BLM does not reject the proposal outright that a complet EIS be written to discuss the environmental impact."	Connie Blaine/Individual (cc:Matheson, UWA,SCC)	36. See response No. 20.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
NEPA REQUIREMENTS			
Negative Impact on Local Economy/ Tourist and Boating Industry	"This project is indeed a major Federal action which will effect the immediate strip mined area, the river environment, the public's use of the area regarding recreation and boating, and a direct impact upon the boating and guiding industry."	Ken Sleight/WRGA & URGA	37. See response No. 27.
	"This year, over 11,000 persons took the Westwater Canyon river trip. The local economy surely benefits from this influx of visitors."	Nicholas Nyer/Business (Houck & Lashier)	38. See response No. 27.
	"As you know, tourism is the source of a lot of money for people in this area and the trips that the commercial companies make down Westwater play a growing part in the economic well-being of the people who live off of tourism in this area."	Connie Blaine/Individual (cc:Matheson, UWA,SCC)	39. See response No. 27.
Questioned Humates being Salable or Leasable	"According to the minutes of the Moab District Advisory Council meeting of 31 July 1981, humates mined for the purpose of soil conditioner is a saleable mineral (which requires only an EA), but that is is only to be handled as a saleable mineral up to a certain Btu content. During the same meeting, Glen Sides, chairman of the Advisory Council, said that a higher Btu content would be encountered away from the outcropping, which would require leasing instead of selling (which would require a thorough EIS). This was certainly not addressed in the EA." "How deep does the proposed humate strip mining plan to go? How does that compare with the high Btu that is encountered at a deeper level that Glen Sides refered to in the Advisory Council meeting?"	Lucy Wallingford/SCC (cc: SD Robison, Rep. Hansen)	40. This is on answered in the "Introduction Background" section of the Final EA.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
NEPA REQUIREMENTS			
Questioned Humates being Salable or Leasable	"How was the decision made to designate this "saleable" material?	Connie Blaine/Individual (cc:Matheson, UWA, SCC)	41. See response No. 40.
EA is Inadequate	"Upon review of the Environmental Assessment, we find a woeful lack of essential information on which to base knowledgeable judgements. There are many threats to the environment and to our operations."	Ken Sleight/WRGA & URGA	42. Additional information and impact analysis has been done in Final EA.
	"The impact on the current, extensive recreational use of the area will greatly effect this resource value of Westwater Canyon. This impact was not discussed in the EA."	Lucy Wallingford/SCC (cc:SD Robison, REP Hansen)	43. The proposed action is not anticipated to have a significant impact on the recreational values of the area including Westwater Canyon. The EA has been expanded to more clearly reflect the recreational values present and the possible effect on them.
Reclamation/Rehabilitation Inadequately Addressed	"The EA does not contain any reasonable discussion of rehabilitation or reclamation or the possibility of serious water pollution problems."	Lucy Wallingford/SCC (cc:SD Robison, REP Hansen)	44. Additional reclamation actions have been added to the Final EA.

THEME/Statement	Reasoning	Who		EVALUATION TEAM: RESPONSE
RECREATIONAL VALUES				
Negative Impact on Westwater's Wild & Scenic Proposal/Designation	"As you are aware, because of its 'outstandingly remarkable values' Westwater Canyon was suggested for Wild & Scenic status in 1979. I feel that any strip mining in an area so close to a proposed wild and scenic area could only be detrimental to that quality which makes that very short stretch of the Colorado River so special as to be classed as wild and scenic." "To allow any strip mining in the area, regardless of size, would eliminate Westwater Canyon from consideration as a Wild and Scenic River."	Michael Jacobs/Individual	45.	The proposed action at its closest point is 2½ miles from the river and at no point can be viewed from the river. This action is over 5 miles from the start of the section of the river proposed for wild classification. Based on the criteria used in the wild and scenic study, this action would in no way disqualify it from consideration as a potential component of the wild and scenic system.
	"This strip mine proposal threatens the proposed Wild and Scenic River designation of Westwater Canyon which was proposed in a 1979 EIS as holding "outstandingly remarkable" values."	Ken Sleight/WRGA & URGA		Other major instructions currently exist between the proposed site including the D&RG railway maintenance and a large block of private land currently used as a sheep ranch.
	"The fact alone that Westwater Canyon, which is only 4 miles from the proposed mine, is a candidate for designation as a Wild & Scenic River with 'outstandingly remarkable' values as required by an Act of Congress is reason enough to reject the proposal." "An EIS should also be required because this has the potential of a major federal action which will affect a proposed Wild and Scenic River. An EIS would address this issue as the EA does not." "Does BLM have a commitment to the Wild and Scenic River Proposal? How would the proposal affectthe pristine nature of an area singled out by Congress as possessing special qualities?"	Lucy Wallingford/SCC (cc:SD Robison, REP Hansen)	46. 47.	See response No. 45. See response No. 45. BLM is firmly connected to the Wild and Scenic proposal. The pristine nature of Westwater Canyon will not be affected by this proposal due to the distance and natural screening provided by topography to the west of the river.
	"This activity would detract from the Scenic and Wild designation as documented in a 1979 EIS."	Tom Rees/Individual	48.	See response No's. 45 and 47.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
RECREATIONAL VALUES			
Negative Impact on Westwater's Wild & Scenic Proposal/Designation	"Since Westwater Canyon has been proposed as a Wild and Scenic River, do you, as District Manager, have a commitment to protect the integrity of the canyon until the Wild and Scenic proposal is voted on by Congress?"	Mary Rees/Individual	49. See response No's. 45 & 47
	"Westwater Canyon is, as you surely know, a very beautiful area, which has all the classifications to become a designated wild andscenic area (as was proposed in 1979). In my opinion the stripping of tons of humates from the area would endanger this fragile area for future wild and scenic legislation." "Is there no other place that this company could find humates, where perhaps the impact would not endanger an area with wild and scenic capability?" "I believe that Westwater should receive its wild and scenic designation and I fear that strip mining the area would considerably lessen its chances."	Barbara Warner/Individual	50. See response No's. 45 & 47
	"Presently, the river corridor is under the consideration of Congress for official designation as a Wild and Scenic River."	Nicholas Nyer/business (Houck & Lashier)	51. See response No's. 45 & 47.
	"Fourth, does BLM really have any commitment to the Wild and Scenic River proposal and is the BLM giving us the true representation of the big picture on this issue?"	Connie Blaine/ Individual (cc:MATHESON, UWA, SCC)	52. See response No's. 45 & 47.
	"This is a proposed Wild and Scenic river area. In these United States, and particularly in Utah, our incredibly beautiful and unique lands and waters are our single most valuable resource. These area should be proudly protected, not abused and permanently obliterated."	Janet McVickar/Individual	53. See response No's. 45 & 47.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
RECREATIONAL VALUES			
Negative Impact on Westwater's 'Wilderness' Values	"It also threatens the integrity of the Westwater Canyon Wilderness Study Area."	Ken Sleight/ WRGA & URGA	54. See response No's. 45 & 47
	"The constant stream of ore and water trucks using the put in road will certainly have an affect on the outstandingly remarkable wilderness qualities that the area currently possesses."	Lucy Wallingford/SCC (cc:SD Robison, REP Hansen)	55. See response No's. 45 & 47.
	"I am very concerned about this proposal and I oppose it for several reasons. I am one who frequents the Canyon for boating in order to enjoy the solitude and beauty the canyon offers."	Mary Rees/Individual	56. See response No's. 45 & 47.
	"Have you ever experienced Westwater Canyon? To be in the canyon is to experience a taste of the incredible wilderness of Utah. People travel from all over the world to explore this very canyon and her unique wonders. I find awe and peace in Westwater." "Please consider the incredible and unique beauty of Westwater Canyon."	Diana Chalmers/Individual	57. See response No's. 45 & 47
	"This land you seek to have destroyed is one of the few remaining virtually wild and wonderful recreation areas of the United States."	P.E.STRALEY-Grega/Individual	58. See response No's 45 & 47.
	"The Westwater Canyon trip is a rare and special wilderness experience, the quality of which would be diminished by the presence of strip mining activity and increased traffic on the access road."	Nicholas Nyer/Business (Houck & Lashier)	59. See response No's 45 & 47.
	"This proposal would ruin the beauty and the outstanding characteristics this place has."	Connie Blaine/Individual (cc:Matheson, UWA,SCC)	60. See response No's 45 & 47.
	"Proposing a stripmining operation adjacent from the river put in is minimizing the outdoor experience for the tourist."	Karen Sue Nunn/Individual	61. See response No's 45 & 47.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
RECREATIONAL VALUES			
Historic Recreational Use of the Area	"The impact on the current, extensive recreational use of the area will greatly effect this resource value of Westwater Canyon. This impact was not discussed in the EA." "What will any amount of stripmining adjacent to the Westwater access do for the recreational experience of users of the area?"	Lucy Wallingford/SCC (cc:SD Robison, REP Hansen)	62. The Final EA has been expanded to cover recreational use and economics.
	"It would interfere with historical recreational use of this area."	Tom Rees/Individual	63. See response No. 62.
	"Another point I would like to address is one of multiple uses. I am familiar with BLM policy regarding this phrase, however, it seems that in today's terms, multiple use simple means energy development. Westwater Canyon is a very popular area for thousands of boaters and hikers each year. If this humate proposal should become a reality I believe that the impact on commercial and private river trips in the area would be negatively impacted." "I have boated and hiked in this area for the last 8 years and I would very much like to continue doing so for many more."	Barbara Warner/Individual	64. Additional economic analysis has been included in the Final EA.
	"Do you think your pockets and those of your conspirators egging this project on should be linned with gold while thousands of other peoples priceless spare moments turn sour because of you?"	PE Straley-Grega/Individual	65. See response No. 64.
	"The current use the area receives from river runners and the impact the mining would have on this use should be specifically addressed."	Pat Grediagin/Individual	66. See response No. 64.
	"Is the demand for this humate material substantial enough to warrant its extraction in an area noted for its scenic beauty and recreational possibilities?"	Nicholas Nyer/Business (Houck & Lashier)	67. See response No. 64.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
RECREATIONAL VALUES			
Historic Recreational Use of Area	"I am emphatically opposed to any strip mining activity occurring in this area due to the certain disastrous impact on the historical and recreational use of the area."	Connie Blaine/Individual (cc:Matheson, UWA, SCC)	68. See response No. 62.
	"As everybody knows, many hundreds of people use the Westwater area for wilderness river experiences. Proposing a stripming operation adjacent from the river put in is minimizing the outdoor experience for the tourist."	Karen Sue Nunn/Individual	69. See response No. 62.
...y Truck Traffic on Westwater Access Road	"The very presence of large trucks, filled with ore, speeding down an already marginal road would pose a very dangerous situation for commercial and private users of Westwater Canyon."	Michael Jacobs/Individual	70. The Final EA has been expanded to explain mitigating of truck traffic.
	"There would be heavy traffic along the Westwater river put in road. Mitigating solutions have not fully been discussed. Not enough information is available."	Ken Sleight/WGRA & URGA	71. See response No. 70.
	"Stripmining adjacant to the Westwater Acess will directly affect the recreational experience of users of the area. The constant stream of ore and water trucks using the put in road will certainly have an affect on the 'outstandingly remarkable' wilderness qualities that the area currently possesses." "How will the conflict of the ore and water trucks and the recreational river users' traffic be adequately resolved?	Lucy Wallingford/SCC (cc:SD Robison, REP Hansen)	72. See response No's. 62 & 70.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
RECREATIONAL VALUES			
Heavy Truck Traffic on Westwater Access Road	"It is my understanding that access to the proposed mine would be along the same road used by boaters and campers to get to Westwater Canyon." "I am very concerned about the proposal and I oppose it for several reasons."	Mary Rees/Individual	72. See response No. 70.
	"The Westwater Canyon trip is a rare and special wilderness experience, the quality of which would be diminished by the presence of strip mining activity and increased traffic on the access road."	Nicholas Nyer/Business (Houck & Lashier)	73. See resonse No's. 45 & 70.
	"Third, what is the BLM's concern regarding the recreational users' experience dealing with a constant stream of ore and water trucks on the put in road?"	Connie Blaine/Individual (cc:Matheson, UWA,SCC)	74. See response No.70.
	"This would be impractical for many reasons, one of them being the fact of too much vehicle traffic on the Westwater road. This road is inadequate and dangerous for the amount of traffic which would be traveling on this road. As it is there is quite a bit of traffic on this road anyhow with people using it for recreational access. Furthermore it would be much too expensive and costly for the taxpayers and the State to provide funds for improvement of the road if such a strip mine would take place."	Gregory Nunn/Individual	75. See response No. 70.
Conservation	"Sir, I would hate to see this area lose its very special qualities."	Barbara Warner/Individual	76. See response No's. 45 & 47.
	"Protect the uniqueness of Utah."	Diana Charland/Individual	77. See response No's. 45 & 47.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
RECREATIONAL VALUES			
Conservation	"Utah is so beautiful, don't you feel a sense of responsibility to maintain it the way it is? You live here, can't you see?"	PE Straley-Grega/Individual	78. No response required.
	"I feel that the quality of our lives is being gradually but relentlessly undermined by the destruction of our beautiful lands and waters. At some point this must stop. Why not now?"	Janet McVickar/Individual	79. No response required.
	"I am against this proposal as I feel it would greatly reduce the natural beauty of the area."	Karen Sue Nunn/Individual	80. See response No's. 45 & 47.
Mining and Recreation Not Compatible"	"I am one who frequents the Canyon for boating in order to enjoy the solitude and beauty the canyon offers. I cannot see that these two use of the land, mining and recreation, are compatible."	Mary Rees/Individual	81. See response No's 45 & 47.
POLLUTION			
Erosion into Colorado River, Salinity	"There is also some question about the erosion which would occur in a strip mining process and where would the eroded soil and pollutants end up?"	Michael Jacobs/Individual	82. All on site erosion would be contained. Contouring ditches would aid in preventing erosion. The water quality of the Colorado River is not expected to change due to this proposal.
	"There was little research done on the effects of soil erosion due to water and wind during and after the strip mining operations. The question of run off and its effect upon the quality of the river in regard to the silt content was not adequately covered."	Ken Sleight/WRGA & URGA	83. See response No. 82.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
POLLUTION			
Erosion into Colorado River, salinity	"Another great concern of ours is the soil erosion into the Colorado River. As the proposed mine is cut by a series of washes which would take the eroded coal into the river, we residents of Moab are particularly concerned with water pollution upstream from our town. The EA does not contain any reasonable discussion of rehabilitation or reclamation or the possibility of serious water pollution problems." "Can the BLM assure Moabites that the water from the Colorado River that flows downstream from the area of proposed mining of humates will not be polluted due to erosion of thelow-grade coal into the area?"	Lucy Wallingford/SCC (cc: SD Robison, REP Hansen)	84. See response No's. 82 & 44.
	"What is known about the effects this mining would have on the Colorado River in terms of soil erosion and polluting effects of the strip mine?"	Mary Rees/Individual	85. See response No. 82.
	"Also, what would the erosion, which naturally occurs in this area, do to the water in terms of pollution. If 40 feet of topsoil must be removed won't a large amount of it, and some of the humates, end up in the river? I do not believe that proper attention has been given to the possibility of water pollution as a result of the strip mining. Therefore, I would like to see the BLM write an EIS which would address these and many more serious questions prior to an agreement with Westwater, Inc."	Barbara Warner/Individual	86. See response No's. 82 & 20
	"This area is also a very pretty area. If such a strip mine would take place it would damage some of the drainage into the Colorado River, and it also would increase the chance of polluting one of the worlds most beautiful river canyons."	Gregory Nunn/Individual	87. See response No. 82. Also no major natural drainages would be disturbed.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
POLLUTION			
Noise	"The amount, intensity and frequency of noise pollution has not been determined and its effect on the enjoyment of recreationists and the boating public and on the effects to various business enterprises. The noise from dozers, tractors, rippers, front-end loaders, generators and blasting could be a major problem. Noise tests apparently were not conducted. They should be."	Ken Sleight/WRGA & URGA	88. The operators would be required to meet the "standard noise level" established by the State for this type of operation.
	"There was little research done on the effects of soil erosion due to water and wind during and after the strip mining operations." "Dust control could be a mjaor problem, and this was not fully treated in the EA."	Ken Sleight/WRGA & URGA	89. Dust levels are not expected to be any worse than normal once reclamation is complete.
OTHER RESOURCE VALUES			
Water (Demands from the Colordo River)	"Strip mining in this area would also require large amounts of water, and exactly where would this water come from? Already the Colorado River's water is in constant demand and decreases year to year."	Michael Jacobs/Individual	90. As mentioned in the Final EA the only water required would be for dust control on the haul road and culinary water. If water is needed from the Colorado River, the Utah State Water Board would determine if it was available for this project. Water rights could also be purchased.
	"Water rights is an issue. It should be determined, as the water is to be hauled from the Colorado River, the amounts of water required, for what uses it will be made and the right to use that water vs other uses."	Ken Sleight/WRGA & URGA	90. See response No. 90.

THEME/Statement	Reasoning	Who	EVALUATION TEAM: RESPONSE
POLLUTION			
Water (demands from the Colo. River)	"I have some serious questions with regards to water to be used in this process, where would it all come from? The Colorado River drainage already has decreased considerably in recent years and I do not believe that this proposal would help the situation. As a matter of fact I have had trouble finding this issue addressed."	Barbara Warner/Individual	92. See response No. 90.
ıter (rights)	"It should be determined just how much salt will be added to the Colorado River due to the drainage and run off. This has a decided effect upon the entire river system, upon international agreements, upon which projects will be developed and on what actins will be taken."	Ken Sleight/WRGA & URGA	93. It is anticipated that there would be no additional salt added to the Colorado River system. Mitigating measures and the mining plan approved by the State should insure no on-site erosion reaches the river.
	"First, where do thepeople who want to strip mine this area intend to get their water? If it is from the Colorado River, I want to Know, where do they get the rights to that water?"	Connie Blaine/Individual (cc:Matheson, UWA,SCC)	94. See response No. 90.
Historic and Preshistoric Resources	"Historic and prehistoric resources have been siscovered in the area. Greater study must be accomplished."	Ken Sleight/WRGA & URGA	95. Each site will be studied prior to disturbance.
ɔssil Flora - Paleontological	"As the area is one of unique fossil flora, it is important scientifically. More study should be accomplished."	Ken Sleight/WRGA & URGA	96. Mining would allow additional study of the fossil remains.
Wildlife	"Just what effect the proposed project would haveon the wildlife of the area and within the adjoining area, must be fully studied. There must be an inventory taken on existing wildlife."	Ken Sleight/WRGA & URGA	97. See wildlife section of the Final EA.

XI. LIST OF PREPARERS

Daryl Trotter
Chief of Planning and Environmental Assistance

Bob Milton
Economist

Wally Miller
Geologist

Jeff Williams
Geologist

Gregg Dawson
Range Conservationist

Beverly Lewis
Wildlife Specialist

Scott Packer
Outdoor Recreation Planner

Dave Minor
Outdoor Recreation Planner

Wayne Svejnoha
Soil Scientist

Mary Plumb
Public Affairs Specialist

APPENDIX

A. 1. Environmental Biochemists Analysis of Humates

2. American Chemical & Research Laboratories Analysis of Humates

B. Definition and Description of Humate

C. Disposal of Humates on Public Land

D. Ford Chemical Lobaroatory, Inc. BTU Analysis

E. BLM Seed Mixture

F. Paleonotological Assessment Report

G. Visual Contrast Rating

H. Cultural Resource Survey

APPENDIX A

CHEMICAL ANALYSES

Environmental Biochemists
4115 SILVER AVE., S. E.
ALBUQUERQUE, NEW MEXICO 87106
Telephone (505) 266-8106 — Night 298-6164

E.B. No. A7550J

May 12, 1975

Ross Martinez
Box 1141
Espanola, N.M. 87532

Sir:
On May 1, 1975, you brought to our laboratory a humate sample for analysis. This is our report.

A solution of the sample was made using 10 grams soil/100ml water, and the solution was analyzed.

	Sample ppm	Recommended Values ppm
pH	7.70	6-8
Organic Matter, %	41.5	
Moisture, %	6.9	
Calcium	80	<6
Iron	34	1000
Sulfate	725	1400
Sodium	58	5
Chloride	<30	some
Magnesium	33	15
Manganese	2.5	0.5
Nitrate Nitrogen	240	18
Phosphate Phosphorus	5.3	20
Potassium	47	<50
Copper	1.0	some
Zinc	3.0	2-3
Lead	12	some
Barium	some	some

Recommended values are for fertilizer. ppm = parts per million. All values are based on wet weight.

If we can be of further service, please contact us. Thank you.

American Chemical & Research Laboratories

6955 SOUTH 1050 WEST • P.O. BOX 452 • SPANISH FORK, UTAH 84660
(801) 798-7471

ENVIRONMENTAL SERVICES O ANALYTICAL & AGRICULTURE CHEMISTS

CERTIFICATE OF ANALYSIS

FLOYD BAKER

DESCRIPTION	DETERMINATION	ANALYSIS
LIGNITE COAL	% Fe	1.00
	PPM Ca	50
	PPM K	710
	PPM Mg	750
	PPM Zn	60
	PPM Mn	20
	PPM Cu	129
	PPM P	72
	PH	4.38
	% N	0.56
	Humic Acid	25.56
	% Organic Matter	52.35
	% Moisture	4.76
	% Ash	42.95
	% S	0.74
	Btu/lb.	5,876

THANK YOU FOR YOUR PATRONAGE,

V.B. BENSON
PRESIDENT

DEFINITION AND DESCRIPTION OF HUMATE

by

Vernon E. Swanson, U.S. Geological Survey, Denver, Colo. 80225

September 28, 1977

Humate is a class or group of natural carbonaceous (organic) substances that is characterized by its being readily soluble in slightly alkaline water; it commonly occurs as a brownish-black gel in peat, a solid brownish-black translucent material associated with low-rank coal (lignite or subbituminous), or a disseminated brownish-black cementing material in sediments, especially sandstone; humate includes materials variously termed dopplerite, leonardite, dakalite, hasemanite, humogelite, native humic acid, and similar types of natural organic substances.

The major-element composition of humate on a dry ash-free basis is generally 50 to 60 percent carbon, 3 to 5 percent hydrogen, 30 to 40 percent oxygen, 1 to 3 percent nitrogen, and 1 to 3 percent sulfur. To be classified as humate, the organic substance is 85 or more percent soluble (exclusive of mineral matter) in a 0.1 N NaOH solution; to be classified as a humate deposit, 25 or more percent of the organic material in the rock or sediment should be soluble in a 0.1 N NaOH solution. The calorific value of humate is low, generally less than 2,220 Kcal/kg (4,000 Btu/lb), and it ignites with difficulty.

Humate is typically formed initially during, and as a product of, the processes of plant decay; or secondarily as a result of the slow natural oxidation of, especially, lignite or subbituminous coal. During the aerobic chemical and bacterial decomposition of plant material, or during the subsurface weathering (oxidation and the wetting and drying) of coal, some organic substances are converted into water-soluble colloidal form (humic acid) which can be transported in natural waters or remain essentially in place, and are flocculated or precipitated from these waters to form humate. The flocculation or precipitation is a result of a natural change in the chemistry of the water, either a change to an acid state (pH generally less than 5) or a change on encountering water containing excess metal ions such as calcium, iron, or copper.

Coal v. Humate ?
Humate is readily soluble in alkaline waters
Coal is not.

APPENDIX C

FILE COPY

IN REPLY REFER TO:

United States Department of the Interior

3600 (723)

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

APR - 6 1978

February 24, 1978

RECEIVED

MAR 6'78

B.L.M. Montrose Dist.

Instruction Memorandum No. 78-97
Expires 9/30/79

To: AFO's

From: Associate Director

Subject: Disposal of Humates on Public Lands a salt or ester of a humic acid.

In a letter dated October 19, 1977, to the Associate Solicitor, Energy and Resources, the Director of the United States Geological Survey basically found that in a broad geological or mining context, humates are to be considered a mineral material. Having established that humates are a mineral in this broad geological sense, the question arises whether humates should be treated as a locatable mineral under the Mining Law of 1872, 30 U.S.C. §21 et seq., or as a common variety of stone under the Materials Act of 1947, as amended, 30 U.S.C. §601 et seq.

The Surface Resources Act of July 23, 1955, 69 Stat. 367 (P.L. 167) explicitly withdraws certain common varieties of minerals from location under the mining law. Section 3 of that act, 30 U.S.C. §611, states in appropriate part as follows:

> "No deposit of common varieties of sand, stone, gravel, pumice, pumicite, or cinders and no deposit of petrified wood shall be deemed a valuable mineral deposit within the meaning of the mining laws of the United States so as to give effective validity to any mining claim hereafter located under such mining laws: Provided, however, That nothing herein shall affect the validity of any mining location based upon discovery of some other mineral occurring in or in association with such a deposit."

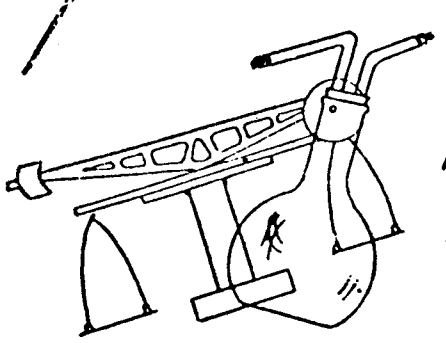
The language of the statute explicitly states that it applies only to specifically enumerated materials, namely, sand, stone gravel, pumice, pumicite, cinders, or petrified wood. The Department of the Interior has found, however, that the term "stone" is extremely broad in meaning,

including material of igneous, sedimentary, or metamorphic orgin, or material of variegated mineral composition ranging, for example, from white limestone to dark basalt. United States v. Harold Ladd Pierce, 75 I.D. 270, 279 (1968).

The position of the Bureau of Land Management is that humates are to be disposed of as a type of stone under the Materials Act of July 31, 1947, as amended, 30 U.S.C. §601. This position is to be maintained until it is demonstrated that (1) humates are locatable under the Mining Law of 1872, i.e., that humate material is not a common variety of stone; and (2) in the event the answer to the first question is found to be in the affirmative, that they constitute a valuable mineral deposit within the meaning of the 1872 Mining Law, as amended; that is, they meet the test of discovery. See United States v. Charles Pfizer, 76 I.D. 331, 336 (1969); United States v. Bunkowski, 5 IBLA 102 (1972).

George I. Turcott

APPENDIX D



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 466-8761

DATE: 01/08/82

CERTIFICATE OF ANALYSIS

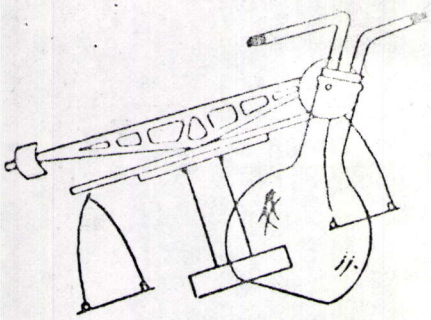
BUREAU OF LAND
MANAGEMENT
PO BOX 970
MOAB, UT 84532

82-008678

SAMPLE: COAL SAMPLES RECEIVED 12-9-81 FOR ANALYSIS.
P.O. #UT-060-PH2-021.

	NM #1	NM #2	V #1	V #2	V #3
Ash %	65.500	19.800	66.400	65.800	25.300
British Thermal Units /lb	2,924	9,191	25.0	381	8,850
Carbon as C %	24.650	32.200	7.000	14.800	26.100
Hydrogen %	1.50	3.80	2.20	2.50	3.10
Moisture %	3.40	16.50	19.20	12.30	22.80
Nitrogen as N %	.3500	.6000	.3300	.4000	.5600
Oxygen as O2 %	4.40	26.20	4.60	3.90	21.50
Sulfur as S %	.180	.880	.220	.270	.600

ACTION	NOAB	INITIALS
DM	[illegible]	
ADM	[illegible]	
PA	[illegible]	
P	[illegible]	
R	[illegible]	DB
P	[illegible]	



Ford Chemical
LABORATORY, INC.
Bacteriological and Chemical Analysis
40 WEST LOUISE AVENUE
SALT LAKE CITY, UTAH 84115
PHONE 466-8761

CERTIFICATE OF ANALYSIS
82-008678

	V #4
Ash %	79.000
British Thermal Units /lb	30.0
Carbon as C %	5.590
Hydrogen %	1.26
Moisture %	10.50
Nitrogen as N %	.2000
Oxygen as O2 %	3.30
Sulfur as S %	.150

FORD CHEMICAL LABORATORY, INC.

APPENDIX E

SEED MIXTURE

Desert — Semi-Desert

(Area coverage) N. highway I-70 to first Bench of Bookcliffs from Green River to Bar X field. All lands So. highway I-70, Black Brush Zones, lands west of 163 to the Green River.

Species		lbs/ac
Grasses		
Oryzopsis hymenoides	Indian ricegrass	1
Hilaria jamesii	Galleta (Curlygrass)	1
Sporobolus cryptandrus	Sand dropseed	1
Forbs		
Aster chilensis	Pacific aster	½
Helianthus annuus	Common sunflower (Kansas sunflower)	½
Melilotus officinalis	Yellow sweetclover	½
Sphaeralcea coccinea	Scarlet globemallow	½
Shrubs		
Atriplex canescens	Fourwing saltbush (White greasewood)	1
Atriplex nuttallii cuneata	Wedgeleaf nuttall saltbush	1
Eurotia lanata	Winterfat (Whitesage)	1

Broadcast seed will be applied at double the above rate.

Seeding will be done in the fall of the year (Oct. - Dec.)

PALEONTOLOGICAL ASSESSMENT REPORT FOR HUMATE REMOVAL FROM WESTWATER AREA

William D. Tidwell

Introduction

The deposits to be mined for humate contain a fossil flora that is very important scientifically. This fern-angiosperm flora from the Lower Cretaceous Dakota Sandstone Formation in Rabbit Valley and in road cuts and areas near the road between U.S. Interstate 70 and Westwater, Grand County, Utah has been under study for some time. It is one of the few paleofloras which illustrate an admixture of an older Jurassic-Wealden floristic type with a modern angiospermous floral aspect. This flora can provide added information for a time in the history of the earth when the flowering plants were expanding from a position of little importance to that of dominance in Upper Cretaceous and later floras. Thus, the flora from the Dakota Sandstone presents a unique challenge and opportunity for angiosperm paleobotany. From additional collecting, scientists will be able to address such basic questions as the nature of early angiosperm reproduction, the relationship of the so-called "primitive" extant angiosperms, early evolution of major groups of angiosperms, types of early angiosperm vegetation and the form in which angiosperms arose, diversified and expanded to dominate the vegetation of the world.

Historical Summary

Fossil plants from the Dakota Sandstone Formation were first collected in the Midwest. These collections were the result of the United States surveys of the Western Territories in the 1850s and 1860s for a route for a proposed trans-continental railroad. Subsequent collections resulted in several publications

on the Cretaceous floras from the interior of North America.

Hayden, in 1853, was the first to obtain leaves from the Dakota Group of Nebraska. He and Meek in 1856-57 produced additional plant materials from these sediments which were sent to professor Heer in Switzerland for his observations. He eventually published on them, giving the first authentic record of North American Cretaceous plant fossils (Heer 1859).

Later excellently preserved leaves were found and collected in large numbers in Kansas during the 1860s and later by various collectors. These collections formed the basis for the first major publications on this flora by Lesquereux (1874, 1883, 1892).

The discovery of fossil plants in the Dakota Sandstone Formation of Utah occurred one hundred years later. They were initially uncovered by Dr. James Jensen of BYU during the early 1960s from the western edge of Rabbit Valley near the Utah-Colorado boundary. Later, I collected extensively in the Westwater area and a portion of these collections were turned over to S. R. Rushforth for study. Various aspects of the Westwater flora have been subsequently published (Tidwell, et al. 1967; Rushforth and Tidwell, 1968; Rushforth, 1970, 1971).

Dilcher and others (1976, 1978, 1979) have recently reported on some interesting reproductive structures from the Dakota Sandstone of Kansas. Similar structures, and others that will be just as important scientifically, may eventually be uncovered in the Dakota Sandstone near Westwater.

Geologic Setting and Distribution

The Dakota Sandstone Formation extends throughout much of the southwestern and midwestern United States. Stanton (1905) in working with Jurassic formations and their relationship with the Comanchian Series and the Dakota Sandstone in

southern Colorado, New Mexico, and Oklahoma, demonstrated that the Dakota Sandstone of this region, as originally defined, contains both Lower and Upper Cretaceous strata. In Utah, the Dakota Sandstone occurs between the Lower Cretaceous Cedar Mountain Formation and the Upper Cretaceous Mancos Shale.

Fossil plants from this Lower Cretaceous sequence near Naturita, Colorado were studied by Brown (1950). He described a flora from the Burro Canyon Formation (equivalent to the Cedar Mountain Formation) and an atypical flora from the Dakota Sandstone. This Dakota flora is atypical in that the incidence of ferns is high as compared with the number of angiosperms.

Most of the fossil plant remains collected from the Dakota Sandstone in the Westwater area were obtained from an ash seam (Fig. 1) approximately forty to forty-five feet beneath the Gryphaea newberryi zone in the overlying Mancos Shale (Rushforth, 1971). This ash layer is light tan in color and varies from five to ten inches thick. It was deposited directly upon one lignite seam and then overlain by another. This ash seam occurs throughout the Westwater area. It can be observed in road cuts along I-70, in outcrops in Rabbit Valley and in exposures in various road cuts and small mining prospects near Westwater. I have also observed fragments of fossil plants collected from a similar ash seam south of Moab. The seam appears to extend over a large area.

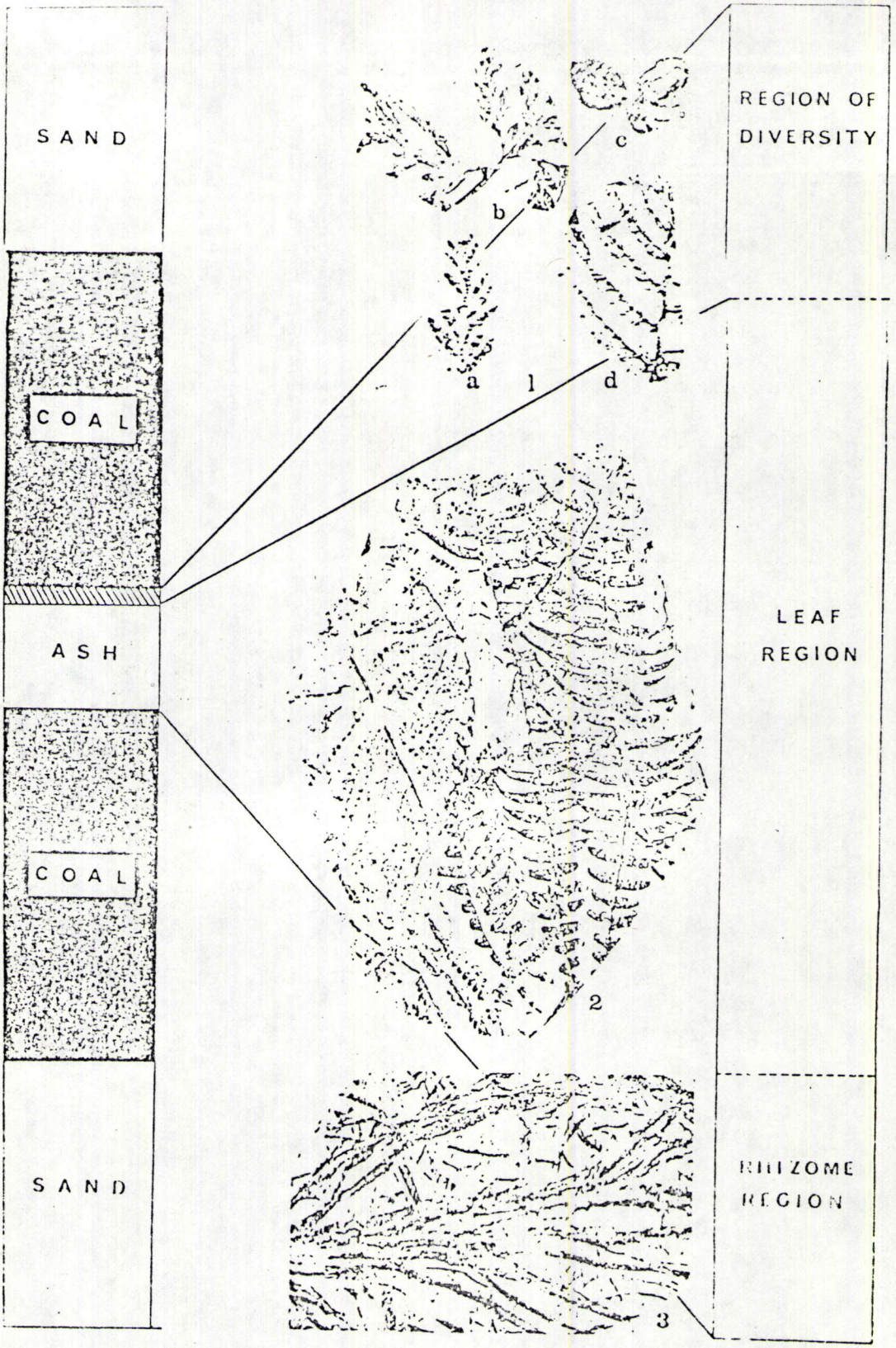
Composition of the Westwater Flora

The Dakota Sandstone flora of Utah is known basically from the locality near Westwater, Utah. Most of these plant fossils are compressions, although some petrifactions are known. Other petrifactions occur near Ferron. The species are listed with a brief description of each.

Division: Arthrophyta, Family: Equisetaceae

Equisetum lyelli Mantel.--Horizontal rhizomes that are smooth to slightly

Figure 1. The fossil plants in the Dakota Sandstone near Westwater, Utah occur in an ash bed between two lignitic coal beds. Representative forms found in the region of diversity (1) include: a) Asplenium, b) Equisetum, c) Cladophlebis. A specimen collected from the leaf region (2) illustrate Gleichenia (left) and Matonidium (right). Rhizome and rootlike structures were collected from the rhizome zone (3).


SAND
COAL
ASH
COAL
SAND
REGION OF DIVERSITY
LEAF REGION
RHIZOME REGION
a
b
c
d
1
2
3

ribbed. These bear ovoid to globose tubers on short paired branches (Fig. 2G).

Division: Filicophyta, Family: Osmundaceae(?)

Cladophlebis constricta Fontaine em. Berry.--Entire leaf unknown from this flora. Pinnules wide with deeply lobed, entire margins, obtuse apices. Midvein strong with open venation. Fertile specimens unknown (Fig. 2E).

Cladophlebis parva Fontaine em. Berry.--Pinna appears lanceolate. Pinnules linear-lanceolate, up to 26 mm lg x 6 mm wd, lobed one-half to midrib, margins slightly undulate, apices acute, midvein to apex, open secondary veins. Fertile specimens unknown (Fig. 2F).

Family: Gleicheniaceae

Gleichenia comptoniaefolia (Deb. and Ett.) Heer.--Common species in this flora. Leaf at least bipinnate. Pinnules narrow elliptic to deltoid, entire margin, obtuse apices; midvein doesn't extend to apex, numerous secondary veins dividing; three round sori per pinnule.

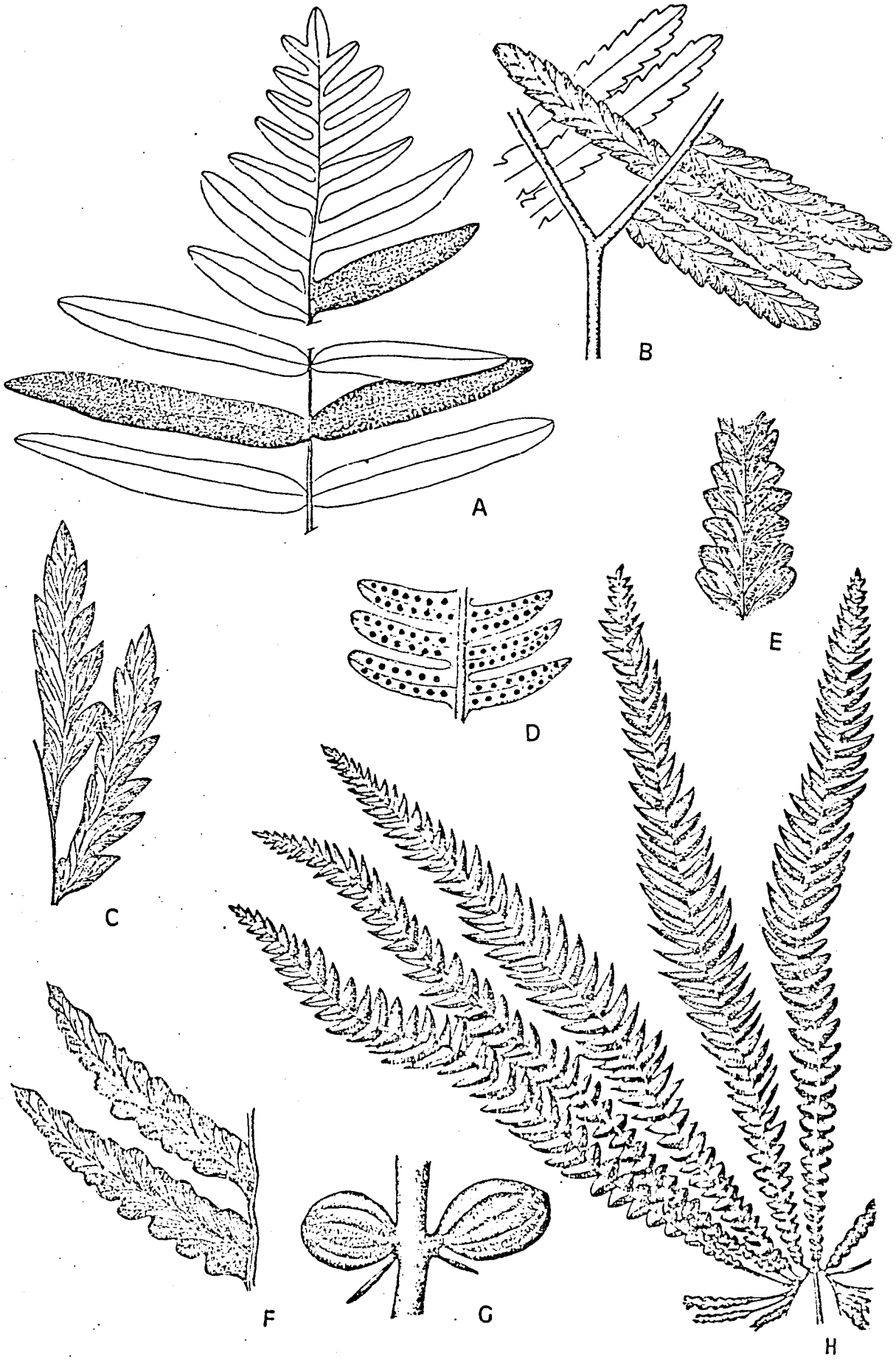
Gleichenia delicatula Heer.--Common species in this flora. Leaf at least bipinnate. Dichotomously branched specimens are often collected having a large bud in the axis of the dichotomy. Pinnules tend toward ovate but have truncated margin toward pinna apex. Acute to obtuse apices directed toward pinna apex. Primary vein divides immediately into 3 to 5 ultimate veinlets. Fertile specimens unknown (Fig. 2B).

Family: Matoniaceae

Matonidium americanum Berry em. Rushforth.--Leaf divides to form collar from which up to 39 pinnae radiate. Pinnules leathery with midvein prominent to near-round apices. Secondary veins divide and remain free of the margins. Round, indusiate sori on each side of midvein.

Matonidium brownii Rushforth.--Matonidium brownii differs from M. americanum in being larger, having less pinnae and in having anastomosing rather than open venation (Figs. 2D, 2H).

Figure 2. Fossil leaves from the Dakota Sandstone Formation. A.--*Astralopteris coloradica* (Brown) Tidwell, Rushforth, and Reveal. B.--*Gleichenia delicatula* Heer. C.--*Asplenium dicksonianum* Heer. D.--*Matonidium brownii* Rushforth. E.--*Cladophlebis constricta* Fontaine em. Berry. F.--*Cladophlebis parva* Fontaine em. Berry. G.--*Equisetum lyelli* Mantel. H.--*Matonidium brownii* Rushforth.


A
B
C
D
E
F
G
H

Matonidium brownii var. magnipinnulum Rushforth.--Similar to M. brownii except larger and narrower pinnules. Round sori with peltate indusium.

Matonidium (?) lançipinnulum Rushforth.--Pinnules linear-lanceolate with anastomosing venation. Fertile specimens unknown.

Family: Dipteridaceae

Hausmannia rigida Newberry.--Divided by nearly equal dichotomies to form tongue-shaped leaf segments with rounded apices. Fertile specimens unknown.

Family: Dicksoniaceae

Coniopteris westwaterensis Rushforth.--Leaf with sterile portion below and fertile above. Sterile foliage has lanceolate pinnules with entire to dentate margins. Fertile pinnules reduced with obscure venation. Sporangia not observed.

Family: Polypodiaceae

Astralopteris coloradica (Brown) Tidwell, Rushforth, and Reveal.--Pinna large. Lower pinnules long, linear-lanceolate with stalked to sessile attachment. Upper pinnules basally attached with rounded sinuses. Midvein and secondaries conspicuous. Ultimate veins finer and anastomosing. Round sori, biseriate on each side of midvein (Fig. 2A).

Asplenium dicksonianum Heer.--Pinnules lanceolate, entire to deeply cut, basal to single point attachment, somewhat decurrent. Midvein prominent and decurrent, open venation. Fertile specimens unknown (Fig. 2C).

Asplenium dakotensis Rushforth.--Similar to A. dicksonianum, but pinnules of A. dakotensis are smaller, entire and strap-shaped. Fertile specimens unknown.

Division: Anthophyta (Magnoliophyta), Family: Aquifoliaceae

Ilex serrata Rushforth.--Leaves vary from short and wide to long and thin, angular-ovate; acute to acuminate apex, narrow base, petiolate, serrate margins, venation often obscure. Midvein weak secondaries arise acutely and go straight to margins.

Family: Magnoliaceae

Magnolia boulayana Lesq.--Leaf narrowly elliptic in outline, base rounded, entire margins; strong midvein secondaries are parallel, pinnate, and unite with vein above to form loops.

Family: Moraceae

Ficus daphnogenoides (Heer) Berry.--Leaves plus or minus oblanceolate (12 cm lg x 3 cm wd), acuminate apices forming a long drip point, cuneate base, entire margin, midvein strong at base becoming weaker near apex. Secondaries ascend acutely, divide and curve to parallel margins.

Eucalyptus dakotensis Lesq.--Linear leaf, cuneate base, entire obtuse apex, petiolated, midvein prominent, secondaries fine, oblique parallel each other to margins.

Family: Platanaceae

Platanus newberryana Heer.

Family: Salicaceae

Salix newberryana Hollick.

Significance

The importance of further collecting of this flora lies in the potential of the fossil material as yet uncovered. Significant angiospermous floral elements in collections from the Dakota Sandstone in other parts of the United States indicate a good probability that additional collecting in the Westwater area will expose some very valuable angiospermous organs, such as structurally preserved flowers, that will have a significant bearing on the phylogeny of the angiosperms (flowering plants).

Considering that the angiosperms today comprise some 96 percent of all vascular land plants, surprisingly little is known of their origin and development. Few topics in natural history have been the subject of as much speculation

as the origin of flowering plants. The most encouraging long-term effect of the recent upsurge in research on angiosperm origins (Hickey, 1978) is the gathering recognition that the fossil record may furnish critical and important evidence on the origin and diversification of flowering plants, as it has in the understanding of mammal, bird, reptile, and amphibian origins.

A considerable amount of preliminary research on the anatomy of the reproductive structures and leaves of these early angiosperms is currently being done on the collections of the Dakota Sandstone of Kansas (Dilcher, et al., 1976; Dilcher, et al., 1978). The Kansas material is no better preserved than the fossil plant material from Westwater. Our collections have been rather limited because of the small number of exposures of this formation from which collections can be made.

A small collection from the Dakota Sandstone made from south of the Henry Mountains contained several well preserved flowers. These fossil flowers are different from those uncovered in Kansas and appear to be related to sycamore (Platanus). Since these occur relatively close to the Westwater site, it is probable that they and other angiospermous reproductive structures are present in the area to be mined.

The ferns that occur in the general vicinity of Westwater are also very important. The living relatives of these ferns presently grow in the Southern Hemisphere. Matonia, the living relative of Matonidium, for example, only grows at about the 4400 foot level in the mountains of the Indo-Malaysian region. Fossils of these ferns are not only relatively rare in North America, but are not very common in the rest of the world. To find them associated and well preserved in the Westwater area is very unique. Because of the rarity of these fern in the fossil record, the opportunity for further study of their phylogeny in the Westwater area is significant.

Associated with the fossil leaf flora is an abundance of petrified wood. Very little of this material has been collected and studied. The time of deposition of the Dakota Sandstone is highly significant in the overview of conifer evolution. It was during this period of geologic history that the conifers were undergoing rapid phyletic divergence. Some researchers refer to many conifers of this mid-Mesozoic period as transitional. During the Jurassic and Lower Cretaceous periods, conifers were evolving as rapidly as at any other point in geologic time. Therefore, it is imperative that these petrified woods, as well as the other mentioned fossil plants, be studied before they are destroyed.

Mitigation

During the process of mining the lignite, any fossils present will be destroyed. Mitigation of these fossils could be achieved by using the following two methods. The first would be a concentrated collecting effort in the area to be mined. This could be done in conjunction with a bulldozer removing overburden, perhaps during exploration. At this time the sandstone forming the overburden could be investigated for any petrified woods. They would be collected whenever they are encountered along with any pertinent data. The second method would follow the first. It would be utilized to collect the fossil materials during the process of mining at designated areas. In these areas after the upper lignite is removed down to the ash bed, the fossils would then be collected from the ash. Then following collecting, the lower lignitic bed would be mined.

REFERENCES

Brown, R. W. 1950. Cretaceous plants from southwestern Colorado. U.S. Geol. Surv. Prof. Paper, 221-D,:45-66.

Dilcher, D. L., Crepet, W. L., Beeker, C. D. and Reynolds, H. C. 1976. Reproductive and vegetative morphology of a Cretaceous angiosperm. Science, 191:854-56.

Dilcher, D. L., Potter, F., and Reynolds, H. C. 1978. Preliminary account of Middle Cretaceous angiosperm remains from the interior of North America. Cour. Forsch.-Inst. Senckenberg, 30:9-15.

Dilcher, D. L. 1979. Early angiosperm reproduction: An introductory report. Rev. of Palaeob. and Palyn., 27:291-328.

Heer, O. 1859. Descriptions of fossil plants from Nebraska.--In Meek, F. B. and Hayden, F. V. Remarks on the Lower Cretaceous beds of Kansas and Nebraska. Phil. Acad., Sci. Proc., 10:265-6; Philadelphia.

Hickey, L. J. 1978 Paleobotany. Geotimes, 23(1):37 p.

Lesquereux, L. 1874. Contributions to the fossil flora of the western territories. Part I. The Cretaceous flora. Rept. U.S. Geol. Surv., 6:136 p.

Lesquereux, L. 1883. The fossil flora of the western territories. Part III. The Cretaceous and tertiary floras. Rept. U.S. Geol. Surv., 8:283 p.

Lesquereux, L. 1892. The flora of the Dakota Group. Monogr. U.S. Geol. Surv., 17:256 p.

Rushforth, S. R. 1970. Notes on the fern family Matoniaceae from western United States. Brigham Young Univ. Geol. Studies, 16:3-34.

Rushforth, S. R. 1971. A flora from the Dakota Sandstone Formation (Cenomanian) near Westwater, Grand County, Utah. Brigham Young Univ. Sci. Bull., 14:44 p.

Rushforth, S. R. and Tidwell, W. D. 1968. Notes on the distribution and morphology of the fern genus Astralopteris. Brigham Young Univ. Geol. Studies, 15:109-13.

Tidwell, W. D., Rushforth, S. R., and Reveal, J. L. 1967. Astralopteris: A new Cretaceous fern genus from Utah and Colorado. Brigham Young Univ. Geol. Studies, 14:237-40.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date: MARCH 21, 1981
District: MOAB
Planning unit: East 1/2 BOOKCLIFFS
Activity:

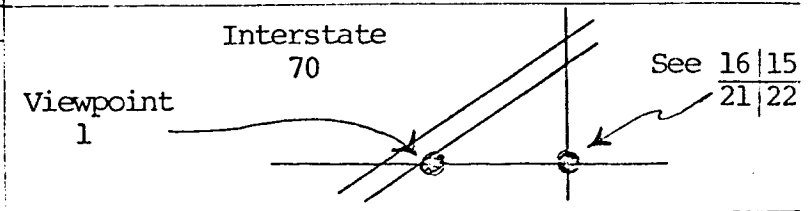
SECTION A. PROJECT INFORMATION

1. Project name: WESTWATER HUMATE MINING
2. Critical viewpoint number: ELEV. 4680
3. MFP Step III VRM class: CLASS III

4a. LOCATION

TOWNSHIP	RANGE	SECTION
19 S	26 S	21

b. LOCATION MAP



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	FLOWING, CURVED RIDGE TOP, GENTLE SLOPES
	LINE	GENTLY CURVELINEAR, BASICALLY HORIZONTAL IN NATURE
	COLOR	UPPER AREA DARK GREEN, LOWER AREA LIGHT TAN, DEFINATE DIVISION LINE BETWEEN ZONING
	TEXTURE	COARSE
2. VEGETATION	FORM	SMOOTH, ROUNDED
	LINE	HORIZONTAL, FREE FLOWING
	COLOR	SAME AS LAND FORM
	TEXTURE	COARSE, SPOTTED AND PATCHY
3. STRUCTURES	FORM	NONE
	LINE	
	COLOR	
	TEXTURE	

(Continued on page 2)

Form 8400—4 (September 1978)
U.S. Government Printing Office - 78-779-312

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	UNCHANGED
	LINE	BLOCKED, DEFINATE HORIZONTAL & VERTICAL
	COLOR	EXPOSED SOILS WILL BE DARKER IN COLOR THAN SURROUNDING
	TEXTURE	EXPOSED AREA WOULD APPEAR AS A PATCH
2. VEGETATION	FORM	SMOOTH, ROUNDED
	LINE	HORIZON UNCHANGED - MINED AREA WILL APPEAR BLOCKED AND PATCHED
	COLOR	MINED AREA DARKER IN APPEARANCE
	TEXTURE	ROUGH AND PATCHED
3. STRUCTURES	FORM	NONE
	LINE	
	COLOR	
	TEXTURE	

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	(4)	0	12	8	(4)	0	12	8	4	0
	Line (3x)	9	(6)	3	0	9	(6)	3	0	9	6	3	0
	Color (2x)	6	4	(2)	0	6	4	(2)	0	6	4	2	0
	Texture (1x)	3	(2)	1	0	3	(2)	1	0	3	2	1	0
TOTALS		14				14				0			

1a. Maximum element contrast

b. Maximum feature contrast

16

2. Does project design meet visual resource management requirements? [X] Yes [ ] No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not prelude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)*

Date JUNE 2, 1981

SECTION E. REDESIGN, STIPULATIONS, MITIGATING MEASURES

RESEEDING AND RECLAMATION

SECTION F. DESCRIPTION OF ACTIVITY *(Redesigned)*

1. LAND/WATER	FORM	FLOWING CURVED RIDGE
	LINE	GENTLE CURVELINEAR, SLIGHT VERTICAL CONTRAST ON PROJECT LIMITS
	COLOR	DARK GREEN AND LIGHT TANS - SLIGHT PATCH APPEARANCE AT PROJECT LIMIT
	TEXTURE	COARSE
2. VEGETATION	FORM	SMOOTH ROUNDED
	LINE	HORIZONTAL FREE FLOWING
	COLOR	SAME AS LAND FORM
	TEXTURE	COARSE, SPOTTED & PATCHY
3. STRUCTURES	FORM	NONE
	LINE	
	COLOR	
	TEXTURE	

(Continued on page 4)

SECTION G. CONTRAST RATING (Re gned)

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	VEGETATION (2) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	STRUCTURES (3) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	(4)	0	12	8	(4)	0	12	8	4	0
	Line (3x)	9	6	(3)	0	9	6	(3)	0	9	6	3	0
	Color (2x)	6	4	2	(0)	6	4	2	(0)	6	4	2	0
	Texture (1x)	3	2	(1)	0	3	2	(1)	0	3	2	1	0
TOTALS		8				8				0			

1a. Maximum element contrast

b. Minimum feature contrast

16

2. Does project design meet visual resource management requirements? [X] Yes [ ] No

If "no," request services of district landscape architect, and describe amount of time and when required.

3. Fiscal year 1980

4. Which third? *(check one)*

[ ] First [ ] Second [X] Third

5. TIME REQUIRED

DAYS	MAN-MONTHS
1	0

SECTION H. RECOMMENDATIONS

1. Recommendation of staff landscape architect if allowable contrast rating cannot be met

Signature | Date

2. Decision and justification of Area or District Manager

Signature | Date

3. Check appropriate box: [ ] Proceed with project/activity as mitigated [ ] Cancel project/activity as proposed

Signature | Date

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date: MARCH 21, 1981
District: MOAB
Planning unit: EAST 1/2 BOOKCLIFFS
Activity:

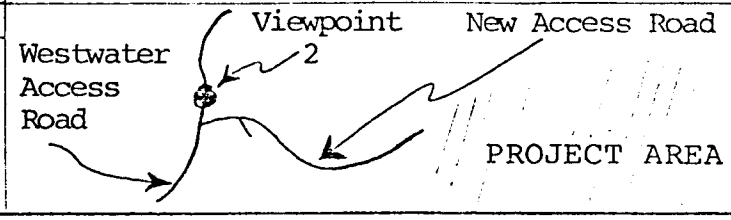
SECTION A. PROJECT INFORMATION

1. Project name: WESTWATER HUMATE MINE
2. Critical viewpoint number: WESTWATER ROAD ELEV. 4620
3. MFP Step III VRM class: CLASS III

4a. LOCATION

TOWNSHIP	RANGE	SECTION
19 S	26 S	22

b. LOCATION MAP



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LAND/WATER	FORM	SMOOTH ROLLING AT RIDGE TOPS, SOME ANGULAR
	LINE	SMOOTH HORIZONTAL CURVELINEAR, SLIGHTLY SLOPING
	COLOR	LIGHT TAN, SPOTTY DARK GREEN
	TEXTURE	COARSE
2. VEGETATION	FORM	ROUNDED, SPOTTY
	LINE	RANDOM
	COLOR	LIGHT TAN, SPOTTY PATCHES OF GREEN
	TEXTURE	TUFFED AND PATCHY
3. STRUCTURES	FORM	NONE
	LINE	
	COLOR	
	TEXTURE	

(Continued on page 2)

Form 8400—4 (September 1978)
U.S. Government Printing Office - 78-779-312

SECTION C. PROPOSED ACTIVITY DESCRIPTION

(Refer to BLM Manual Section 8131 for proposed descriptions and requirements)

1. LAND/WATER	FORM	BLOCKY
	LINE	BROKEN
	COLOR	DARKER AREAS WHERE LAND HAD BEEN DISTURBED
	TEXTURE	BLOCKY AND DISSECTED
2. VEGETATION	FORM	BLOCKED
	LINE	VERTICAL, JAGGED
	COLOR	DARK AREAS WHERE VEGETATION HAS BEEN REMOVED
	TEXTURE	BROKEN
3. STRUCTURES	FORM	NONE
	LINE	
	COLOR	
	TEXTURE	

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	(8)	4	0	12	(8)	4	0	12	8	4	0
	Line (3x)	9	(6)	3	0	9	(6)	3	0	9	6	3	0
	Color (2x)	6	(4)	2	0	6	(4)	2	0	6	4	2	0
	Texture (1x)	3	(2)	1	0	3	(2)	1	0	3	2	1	0
TOTALS		20				20				0			

1a. Maximum element contrast

b. Maximum feature contrast

16

2. Does project design meet visual resource management requirements? ☐ Yes ☐ No

If "no," (or if rating is over maximum allowable) redesign project in section E, concentrating on feature/element of greatest contrast. If contrast is acceptable, this does not prelude additional mitigating measures; propose as stipulations, and list in section E.

Evaluator *(signature)*

Date June 2, 1981

SECTION E. REDESIGN, STIPULATIONS, MITIGATING MEASURES

A. SMOOTH AND ROUND FILL AREAS
B. RESEED AND RECLAIM AREA
C. DISC AND RESEED NEW ACCESS ROAD

SECTION F. DESCRIPTION OF ACTIVITY *(Redesigned)*

1. LAND/WATER	FORM	SMOOTH ROLLING, SOME ANGULAR AT RIDGE TOPS
	LINE	SMOOTH HORIZONTAL, SLIGHT BLOCKY APPEARANCE, SLOPING
	COLOR	LIGHT TAN
	TEXTURE	SMOOTH
2. VEGETATION	FORM	SMOOTH, SLIGHTLY BANDED
	LINE	BLOCKY VERTICAL AND HORIZONTAL LINE
	COLOR	LIGHT TAN
	TEXTURE	SMOOTH TUFTED
3. STRUCTURES	FORM	NONE
	LINE	
	COLOR	
	TEXTURE	

(Continued on page 4)

SECTION G. CONTRAST RATING (R igned)

DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	VEGETATION (2) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)	STRUCTURES (3) Strong (3x)	Moderate (2x)	Weak (1x)	None (0x)
ELEMENTS	Form (4x)	12	8	(4)	0	12	8	(4)	0	12	8	4	0
	Line (3x)	9	(6)	3	0	9	(6)	3	0	9	6	3	0
	Color (2x)	6	4	(2)	0	6	4	(2)	0	6	4	2	0
	Texture (1x)	3	2	(1)	0	3	2	(1)	0	3	2	1	0
TOTALS		13				13				0			

1a. Maximum element contrast

b. Minimum feature contrast

16

2. Does project design meet visual resource management requirements? [X] Yes [ ] No

If "no," request services of district landscape architect, and describe amount of time and when required.

3. Fiscal year	4. Which third? *(check one)*	5. TIME REQUIRED	
		DAYS	MAN-MONTHS
1980	[ ] First [ ] Second [X] Third	1	0

SECTION H. RECOMMENDATIONS

1. Recommendation of staff landscape architect if allowable contrast rating cannot be met

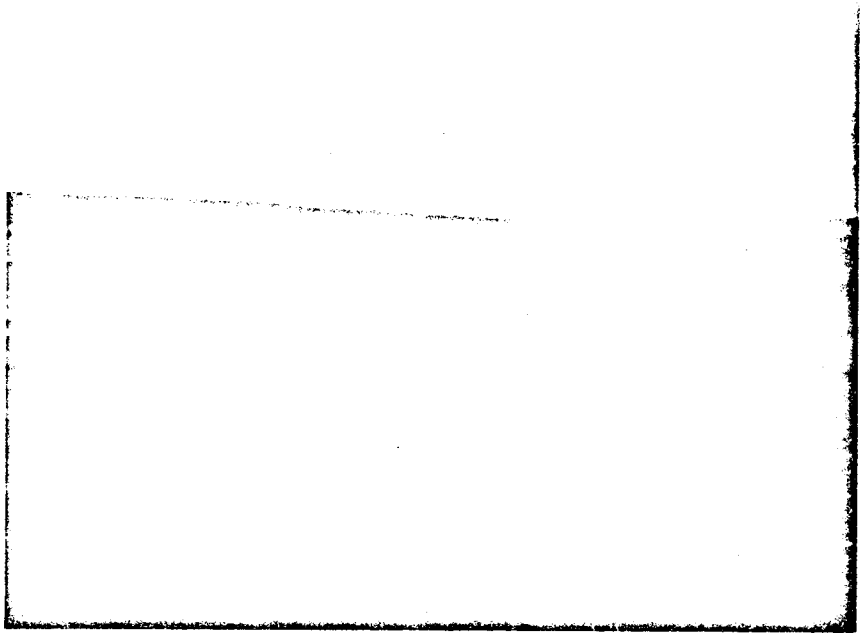
Signature	Date

2. Decision and justification of Area or District Manager

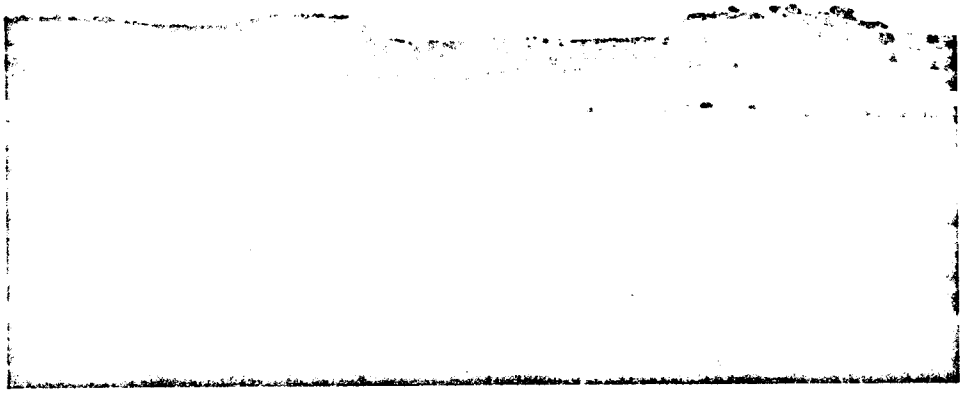
Signature	Date

3. Check appropriate box: [ ] Proceed with project/activity as mitigated [ ] Cancel project/activity as proposed

Signature	Date



VIEWPOINT #1
INTERSTATE 70



VIEWPOINT #2
WESTWATER ACCESS ROAD

APPENDIX H

A Cultural Resource Survey Of A Proposed Humate Mine In Grand County, Utah

by
Richard Clements

Archeological Center
Department of Anthropology
University of Utah

Reports of Investigations No. 81-7

Prepared for
P/S Associates, Inc.

April 1981

Abstract

An archeological survey of a proposed humate mine was conducted in Grand County, Utah, on March 19, 20, and 21. One historic and seven prehistoric sites were found. Six of the sites are in the proposed mine area. All of these sites, particularly 42GR1045, should be avoided or mitigated.

INTRODUCTION

This report is submitted in partial fulfillment of an agreement between the University of Utah and P/S associates, Inc. for the survey of historic and prehistoric sites within the 200 acre area of a proposed humate mine in Grand County, Utah. This land is administered by the Bureau of Land Management, Moab District Office. The survey was conducted by Tim McEnany and Richard Clements.

SETTING AND LOCATION

The proposed humate mine is located southeast of the Book Cliff-Roan Plateau physiographic region of east-central Utah. Immediately to the west, and running north-south, is Coal Draw. The Colorado River is located approximately 3 kilometers to the southwest. The mine area is cut by a series of washes trending southwest to northeast. The topsoil is thin, with exposed sandstone slabs on the ridge tops. The project area lies between 4660 ft. above sea level and 4900 ft. above sea level.

Vegetation of the ridge tops is dominated by Juniperus and Artemisia, with, in descending order of frequency, Atriplex confertifolia, Guterriza, Ephedra, Opuntia, and Cleome. The slopes and washes between the ridge tops are inhabited by Bromus tectorum, Artemisia, Oryzopsis hymenoid, and Opuntia.

SURVEY PROCEDURE

Access to the site was via the Westwater Exit on Interstate 70, between Thompson, Utah, and Fruita, Colorado. A two-man crew walked the area, covering a maximum of 25 meters with each pass. Notes on vegetation, soil, and isolated finds were taken during the survey. The archeological sites were recorded using standard techniques, including photographs. Sites were plotted on either the U.S.G.S. 7.5 minute Harley's Dome map or the U.S.G.S. 7.5 minute Bitter Creek Well, Utah-Colorado.

Because of the dense growth of juniper on the ridge tops, it was difficult to determine the location of many of the sites until the last day of survey when the quarter marker between sections 22 and 23 was located. It was determined at that time that 2 of the sites, 42GR1043 and 42GR1044, were outside of the proposed mine area. The other sites were replotted accordingly.

SURVEY RESULTS AND RECOMMENDATIONS

Site 42GR1039 is a small lithic scatter on a ridge top overlooking Coal Draw. The area is dominated by Juniperus with Artemisia, Ephedra, Atriplex confertifolia, and Guterriza. Cultural material observed included quartzite and chalcedony flakes and one chalcedony biface fragment. No diagnostic artifacts were found.

Site 42GR1040 is composed of three small(15-20) concentrations of chert flakes in an area of approximately 225 square meters. The vegetation is similar to that of 42GR1039, with the addition of Cleome. No diagnostic artifacts were found.

Abstract

An archeological survey of a proposed humate mine was conducted in Grand County, Utah, on March 19, 20, and 21. One historic and seven prehistoric sites were found. Six of the sites are in the proposed mine area. All of these sites, particularly 42GR1045, should be avoided or mitigated.

INTRODUCTION

This report is submitted in partial fulfillment of an agreement between the University of Utah and P/S associates, Inc. for the survey of historic and prehistoric sites within the 200 acre area of a proposed humate mine in Grand County, Utah. This land is administered by the Bureau of Land Management, Moab District Office. The survey was conducted by Tim McEnany and Richard Clements.

SETTING AND LOCATION

The proposed humate mine is located southeast of the Book Cliff-Roan Plateau physiographic region of east-central Utah. Immediately to the west, and running north-south, is Coal Draw. The Colorado River is located approximately 3 kilometers to the southwest. The mine area is cut by a series of washes trending southwest to northeast. The topsoil is thin, with exposed sandstone slabs on the ridge tops. The project area lies between 4660 ft. above sea level and 4900 ft. above sea level.

Vegetation of the ridge tops is dominated by Juniperus and Artemisia, with, in descending order of frequency, Atriplex confertifolia, Guterriza, Ephedra, Opuntia, and Cleome. The slopes and washes between the ridge tops are inhabited by Bromus tectorum, Artemisia, Oryzopsis hymenoid, and Opuntia.

SURVEY PROCEDURE

Access to the site was via the Westwater Exit on Interstate 70, between Thompson, Utah, and Fruita, Colorado. A two-man crew walked the area, covering a maximum of 25 meters with each pass. Notes on vegetation, soil, and isolated finds were taken during the survey. The archeological sites were recorded using standard techniques, including photographs. Sites were plotted on either the U.S.G.S. 7.5 minute Harley's Dome map or the U.S.G.S. 7.5 minute Bitter Creek Well, Utah-Colorado.

Because of the dense growth of juniper on the ridge tops, it was difficult to determine the location of many of the sites until the last day of survey when the quarter marker between sections 22 and 23 was located. It was determined at that time that 2 of the sites, 42GR1043 and 42GR1044, were outside of the proposed mine area. The other sites were replotted accordingly.

SURVEY RESULTS AND RECOMMENDATIONS

Site 42GR1039 is a small lithic scatter on a ridge top overlooking Coal Draw. The area is dominated by Juniperus with Artemisia, Ephedra, Atriplex confertifolia, and Guterriza. Cultural material observed included quartzite and chalcedony flakes and one chalcedony biface fragment. No diagnostic artifacts were found.

Site 42GR1040 is composed of three small(15-20) concentrations of chert flakes in an area of approximately 225 square meters. The vegetation is similar to that of 42GR1039, with the addition of Cleome. No diagnostic artifacts were found.

Site 42GR1041 is located on the edge of a ridge approximately 4 kilometers from the end of the access road into the site. The site is bounded on the north by a large, ephemeral drainage. Approximately 75 flakes were observed, made of chert, chalcedony, or quartzite. No diagnostic artifacts were found.

Site 42GR1042 is a small scatter of non-diagnostic flakes situated about 1.2 kilometers east of Coal Draw. The immediate area is dominated by Artemisia, with other small understorey plants occurring.

Site 42GR1043 is a small(10x10 meter) scatter of flakes outside the mine area. The site is situated on a small ridge between two washes. The immediate vegetation is composed of Juniperus and Artemisia, with some Guterriza and Ephedra. No diagnostic artifacts were found.

Site 42GR1044 consists of three concentrations of debitage within a 100x50 meter area on a ridge top. A thick biface was found in the southernmost concentration. The immediate vegetation is composed of Juniperus and Ephedra. No diagnostic artifacts were found. The site is outside the proposed mine area.

Site 42GR1045 is a very large scatter of chert, chalcedony, and quartzite flakes. The site contained a red sandstone mano and two hearths enclosing ashy soil. The site is located at the head of a very steep draw on the southern boundary of the mine area. A seep occurs at the head of the draw, with thick Salicaceae growth below and around it. The rest of the vegetation on this site is similar to the other sites, with the addition of Berberis.

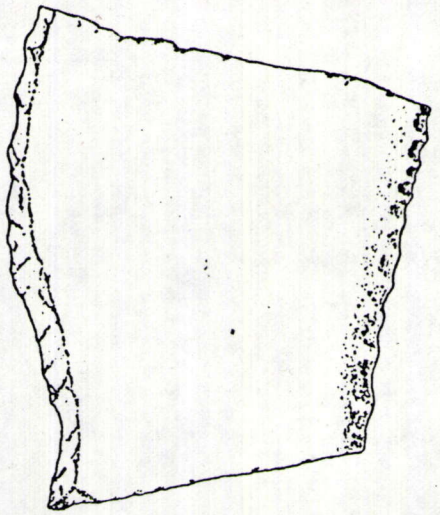
Site 42GR1046 is an historical site of about 400 square meters. The site consists of a scatter of tin cans, the remains of a wood-burning stove, charcoal from the stove, and the remains of a wood pile. No evidence of any structure was observed.

42GR1039,-40,-41, and -42 are all small sites with low concentrations of flakes. No diagnostic artifacts were found. It is recommended that these sites be avoided. If it is not possible to avoid these sites, they should be intensively collected

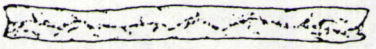
42GR1045 is a potentially important site. It may contain 10,000 or more flakes. The fact that no diagnostic artifacts were found is probably due to the fact that little time was available for a complete investigation of the site. An intensive collection of the area would probably recover diagnostic artifacts. Any further work should include sampling of the hearths for radiometric dating. In any case, it is recommended that this site be avoided.

The historic site, 42GR1045, is not unique to the area, but may provide data about early grazing practices in east-central Utah.

Two sites, 42GR1043 and 42GR1044, were found outside of the proposed mine area. They are not endangered if the proposed boundaries are observed.

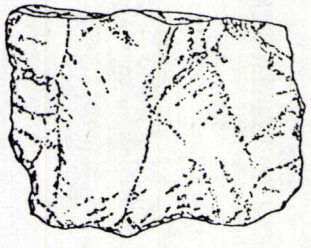


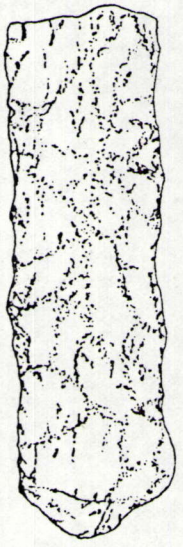
Serrated quartzite fragment showing extreme wear on use edge. Recovered from 42GR1045.



Scale 1:1

Chert end scraper. Recovered from 42GR1044.





Quartzite biface from 42GR1045.

REFERENCES

Anderson, Berniece A.
1976 Desert Plants of Utah. The Utah Cooperative Extension Service, Utah State University, Salt Lake City.

Stokes, William L.
1952 Subdivisions of the Major Physiographic Provinces in Utah. Utah Geology, Volume 4, No. 1.

DISTRIBUTION LIST

Contractor: P/S Associates, Inc.
307 West 200 South
Salt Lake City, Utah 84101

Attn: Bruce Whited

Federal Agencies:

Mr. Richard Fike
Bureau of Land Management
University Club Building
136 E. South Temple
Salt Lake City, Utah 84111

Mr. Elmer Duncan
Bureau of Land Management
Grand Resource Area
125 W. 2nd South
Moab, Utah 84532

Mr. Bruce Louthan
Bureau of Land Management
Moab District Office
P.O. Box 970
Moab, Utah 84532

State Agencies:

Dr. David B. Madsen
Antiquities Section
Utah State Historical Society
300 Rio Grande-Room 210
Salt Lake City, Utah 84101

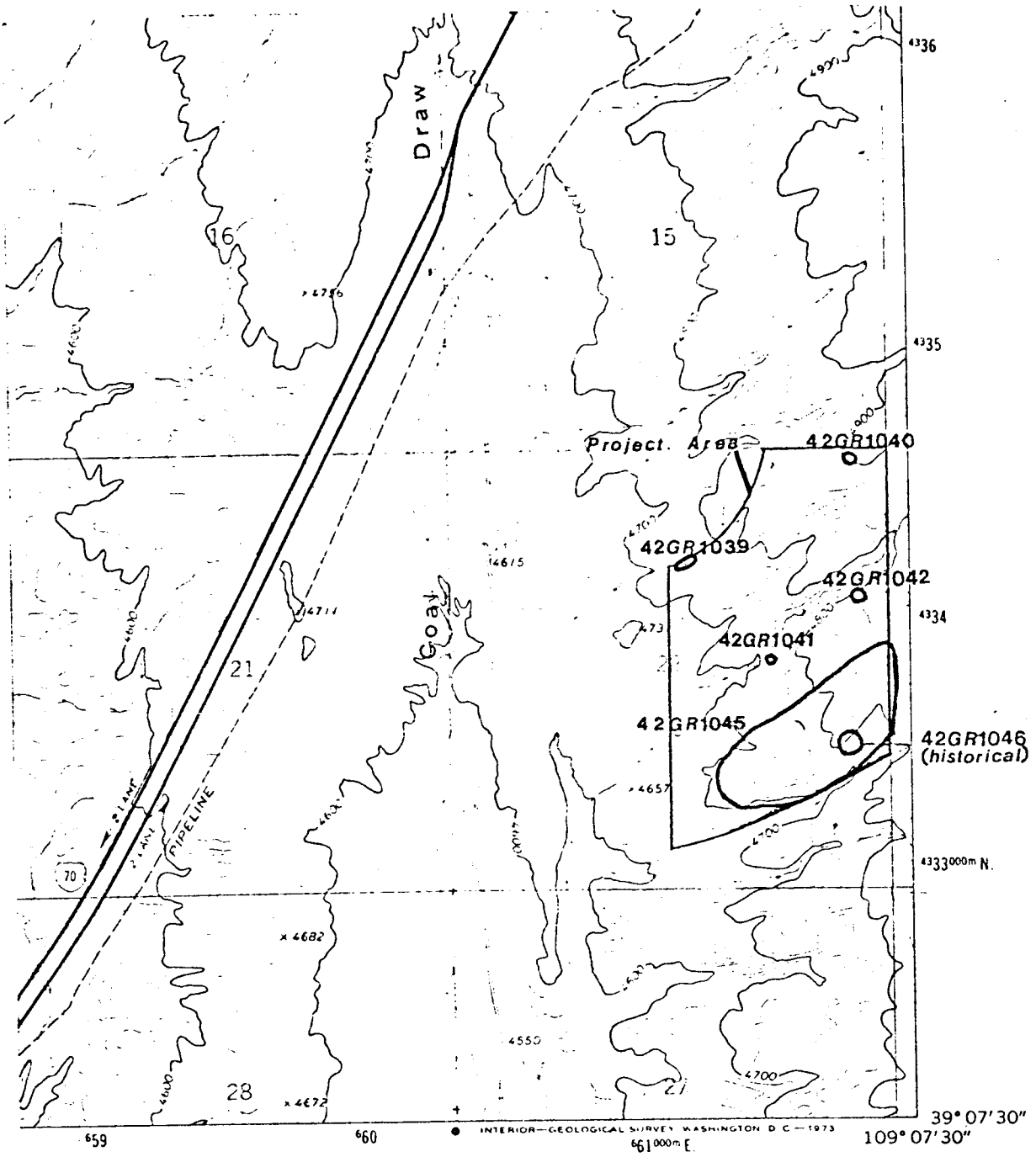
Report Title:

McEnany, Tim A Cultural Resource Survey of a Proposed Humate Mine in Grand County, Utah.

April 1981 UUAC Reports of Investigations No. 81-7

THE UNIVERSITY OF UTAH

ARCHEOLOGICAL CENTER
DEPARTMENT OF ANTHROPOLOGY
STEWART BUILDING
SALT LAKE CITY, UTAH 84112
801-581-8663



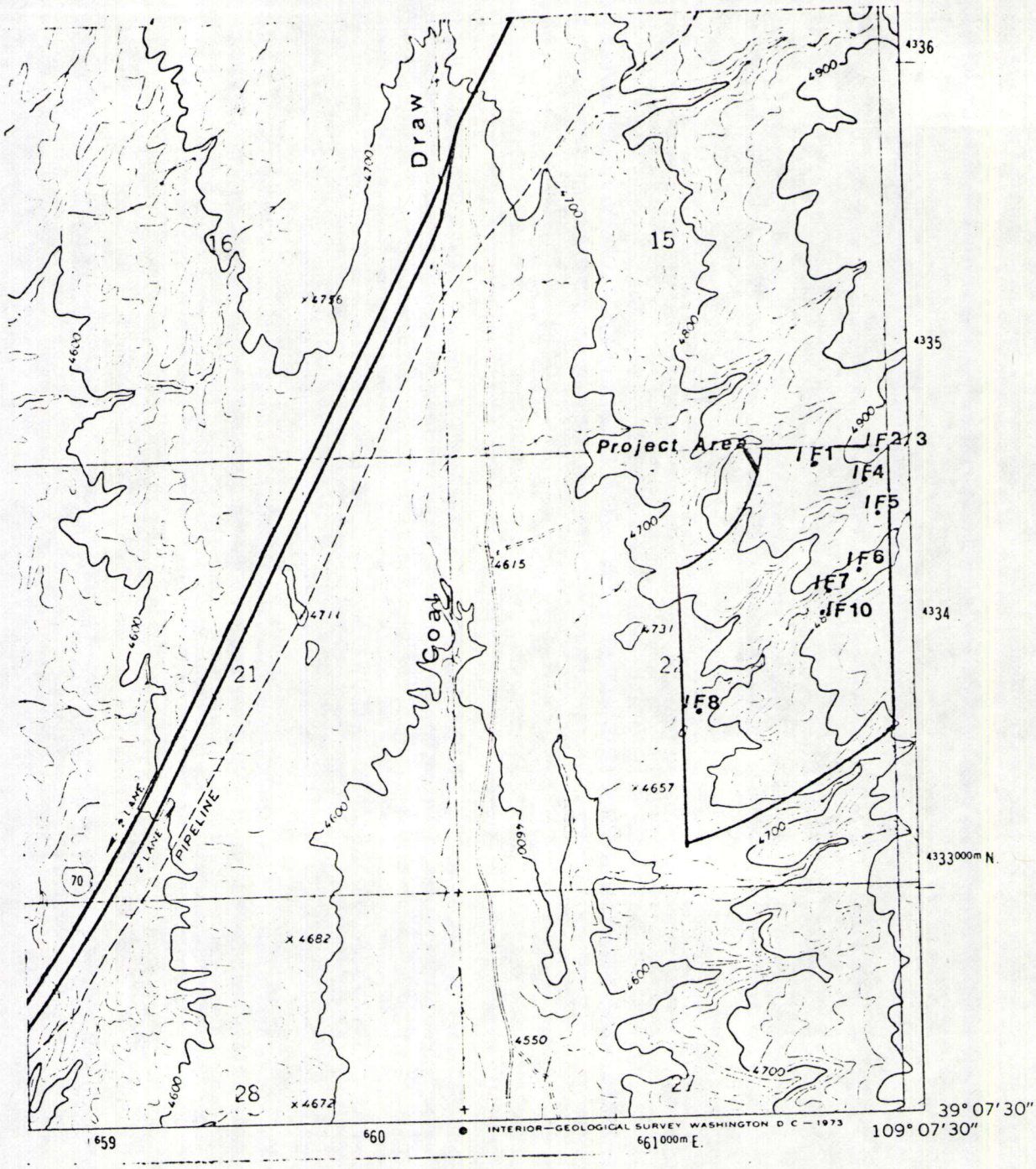
From: Harley Dome, Utah, 7.5' Topographic Series
T19S, R25E, Grand County, Utah.

O Archeological Site

Map 1. Map of Project Area showing sites.

THE UNIVERSITY OF UTAH

ARCHEOLOGICAL CENTER
DEPARTMENT OF ANTHROPOLOGY
STEWART BUILDING
SALT LAKE CITY, UTAH 84112
801 581 8663



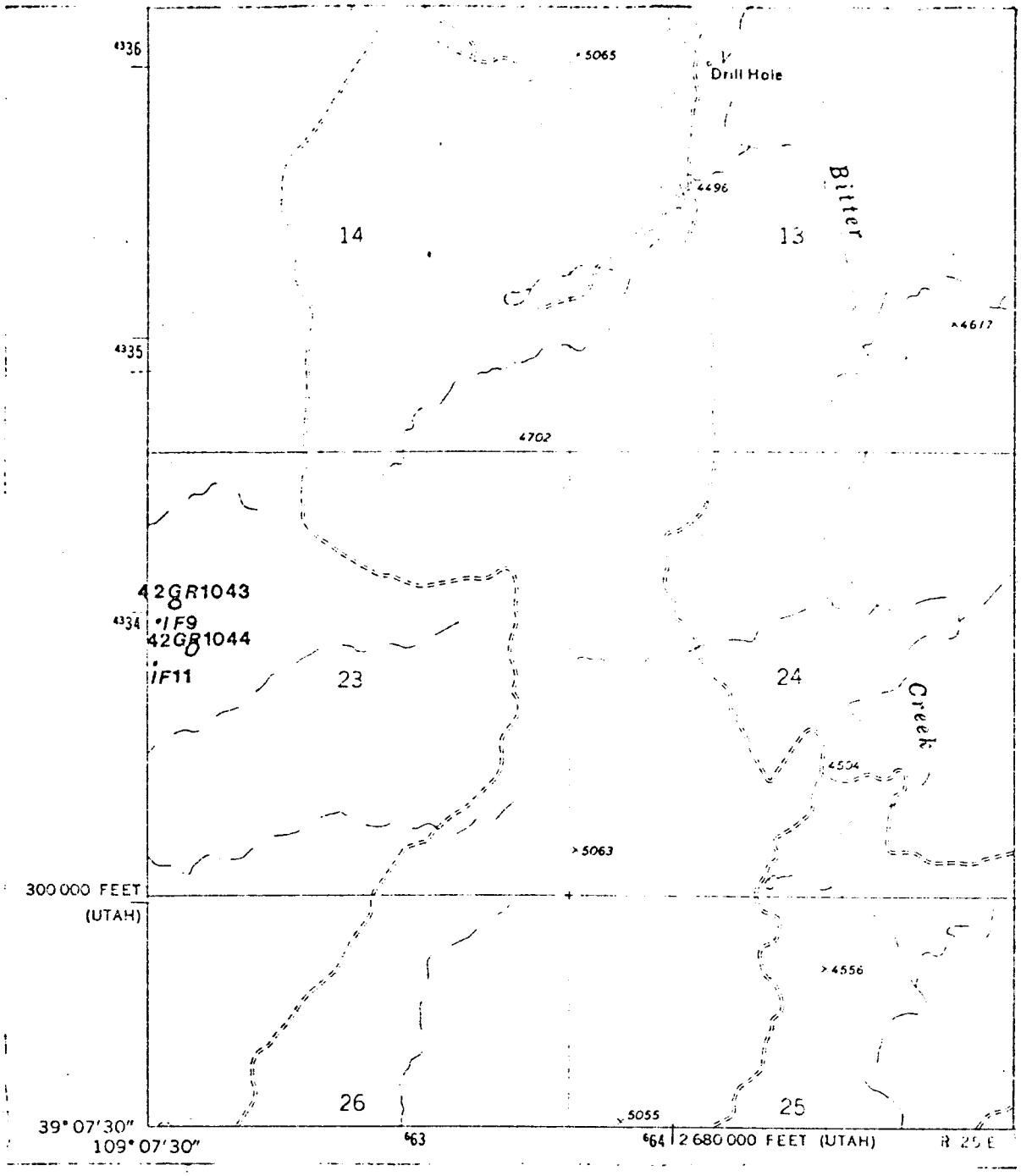
From: Harley Dome, Utah, 7.5' Topographic Series
T19S, R25E, Grand County, Utah.

• IF Isolated Find

Map 2. Map of Project Area showing Isolated Finds

THE UNIVERSITY OF UTAH

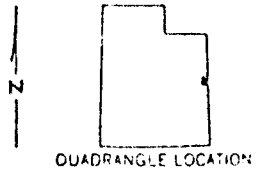
ARCHEOLOGICAL CENTER
DEPARTMENT OF ANTHROPOLOGY
STEWART BUILDING
SALT LAKE CITY, UTAH 84112
801 581 6363

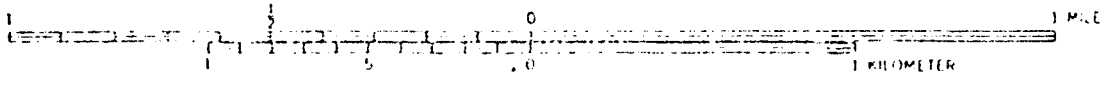


From: Bitter Creek Well, Utah, Colorado 7.5' Topographic Series T19S, R25E, Grand County, Utah

O Archeological Sites; IF • Isolated Find

Map 3. Map of Sites and Isolated Finds outside the Project Area.





Map 3. Map of sites and Isolated